IMPROVEMENT OF TEACHING IN SECONDARY SCHOOLS

THIRD EDITION
REVISED

370.1
But

FRANK A. BUTLER

$4.75

THIS FUNDAMENTAL BOOK for the modern study of teaching as a science is now revised to assimilate the latest facts and theories in education. A chapter has been added; references, illustrations, and bibliographies have been brought up to date; new sections cover such recent developments as the use of audio-visual materials, the influence of radio and television, and the new theories of group processes. As in previous editions, the whole discussion is oriented to the problems of secondary-school teaching.

Rendered vividly contemporary as a text for young teachers and student teachers by these additions and revisions, the book has not, however, sacrificed any of the power of its original thesis. Professor Butler believes that teaching must be conceived of as a science, resting on clearly defined principles, and *not* simply as a random collection of skills. Convinced that, both in teacher-training in colleges and in actual teaching in secondary schools, there has been too much technique, too little insight, he proceeds *first* to the elucidation of principles.

(*Continued on back flap*)

325

This book was taken from the Library of Extension Services Department on the date last stamped. It is returnable within 7 days .

THE IMPROVEMENT OF TEACHING IN SECONDARY SCHOOLS

THE IMPROVEMENT OF TEACHING IN SECONDARY SCHOOLS

[*Third Edition*]

By FRANK A. BUTLER

INSTITUTE OF EDUCATION FOR WOMEN
326
Dept. of Extension
SERVICE.
CALCUTTA-27

THE ALL INDIA COUNCIL
4/19 D.A.G. Extension
Ajmeri Gate
NEW DELHI
FOR SECONDARY EDUCATION

THE UNIVERSITY OF CHICAGO PRESS

370.1
But

THE UNIVERSITY OF CHICAGO PRESS, CHICAGO 37
Cambridge University Press, London, N.W. 1, England

Copyright 1939, 1946, and 1954 by The University of Chicago. All rights reserved. *Published 1939. Third Edition 1954. Composed and printed by* THE UNIVERSITY OF CHICAGO PRESS, *Chicago, Illinois, U.S.A.*

PREFACE TO THE THIRD EDITION

> My law books are for sale. My office is to let. The bar is no longer my forum. I have abandoned jurisprudence and betaken myself to the larger sphere of minds and morals.
>
> HORACE MANN

THIS quotation from the great leader of education in this country should kindle a fire in the hearts of prospective teachers as well as in the hearts of those who have taught for years. While many kinds of labor are needed to do the world's work, no other labor is more important than that one which initiates and improves growth in the realm of minds and morals. Shaping and molding human beings is a noble but a difficult enterprise. It is in this enterprise that teachers are engaged; it is here that the destinies of millions of our youth are determined.

The training of teachers is, of course, directly connected with the sphere of minds and morals—in short, with the development of youth in our schools. Teaching secondary-school pupils is a highly professional undertaking, and the responsibilities of secondary-school teachers are determined by the guidance and direction needed by pupils in order that their educational growth be promoted with the maximum of profit.

In training prospective teachers, too much emphasis has probably been laid upon techniques in teaching and not enough on the development of an understanding of what teaching really is. If one tries to think out a satisfactory answer to the question, "Why do we have teachers?" he will find that thinking out the answer is not quite so easy as it at first seems, and yet the thinking will lead to the real purposes of teaching. Teachers surely must be trained and placed in positions for some good reasons. Obviously, pupils must be brought into consideration, as must also the question of what should be learned and how it should be learned, which brings forth the whole problem of objectives and the psychology of learning. If pupils do the learning,

then teaching is also concerned with individual differences in ability to learn. And so an answer to the question, "Why do we have teachers?" becomes more and more complicated and involved. Eventually, the continued thinking does give general perspective. Teachers have definite teaching responsibilities in guiding the educational progress of young persons who are generally unable to guide themselves wisely and effectively.

Investigations show that the teaching process can be broken down into thousands of specific activities. To gain an understanding and a perspective of teaching by trying to study and master these thousands of separate items would be tedious and frustrating. Hope then must come from mental groupings and classifications. In short, one must see teaching as a few large and inclusive responsibilities rather than as numerous nonrelated acts. If one sees the large areas, he will have no difficulty in sensing how the numerous parts fall under major divisions. Just as in the case of any other profession, the prospective teacher should know what his responsibilities are and then should prepare himself to carry out those responsibilities faithfully and effectively. Responsibilities are determined by the demands of the particular profession.

As used in the treatment of teaching in this book, the responsibilities of teachers to pupils are called "principles of teaching." Every secondary-school teacher has, therefore, certain principles of teaching to fulfil in guiding the progress of pupils during their preparation for better living. By teaching out these principles, teachers discharge their professional obligations.

This book has for its purposes the development of an understanding of the principles of teaching and the utilization of means leading to the fulfilment of the principles. If one has the principles clearly in mind, a perspective of teaching is secured, and the employment of means then becomes a process of working toward clearly defined ends.

Part I gives the background of education in the United States with special emphasis upon secondary schools. This background

enables the student to visualize the conditions and problems confronting education, and out of these circumstances he will be in a better position to realize that teaching itself is influenced greatly by the conditions and problems confronting secondary schools. The eight principles of teaching are then brought out by problematic situations.

Part II includes treatment of the first five principles of teaching. It was thought the wiser plan to develop the first five principles and then apply these to classroom teaching instead of treating the eight principles in order. The first five principles are so fundamental that they must be fulfilled in teaching before instruction can have any worthy degree of substance. Again, it was thought that application should not be delayed too long. However, it is impossible to treat principles of teaching dissociated from ways to fulfil them, so considerable explanation of fulfilment is interwoven with the discussion of each principle.

Part III shows how to use common classroom procedures which have significant possibilities for carrying into effect the principles, especially the first five. Such fundamental procedures as making assignments, asking questions, socializing the classroom work, and directing study are teaching procedures so universally used that they should be developed to their maximum instructional potentialities.

Part IV deals with the last three principles of teaching. These three, especially providing for individual differences and administering diagnostic and remedial measures, are more difficult to fulfil in everyday teaching than are the first five. They are probably understood better after the first five have been studied and applied.

Part V deals with those aspects of teaching which come as final applications of the principles. Measuring the results of learning and planning instruction are two phases of teaching which cannot be performed effectively until the eight principles are very well comprehended.

The organization followed in the book is based upon the way, in the author's experience, a person learns to understand teach-

ing. Best results can be secured by studying the presentation as developed. Frequently, the content is written in the second person to give emphasis and to facilitate directness.

At the ends of chapters are application exercises which the reader can work out for himself or the instructor can include as part of the assignment. Learning to teach by learning to learn is excellent psychology.

Writers of books on methods of teaching must necessarily make a choice of materials. In this book the emphasis has been placed primarily upon principles underlying good teaching anywhere and everywhere. The author has selected those methods and procedures which, in his experience, teachers will most likely use in their everyday work in the classroom while striving to fulfil the principles. Improvement of teaching comes about through the increase in the quality, soundness, and substance of instruction more often than through radically new departures. The potential power in the common and universal methods of teaching has been only partially utilized—greater release of this potential should not be overlooked in a book on methods. If methods are too far removed from real situations, then their applicability is greatly reduced, probably to the point of no application. Better by far is it to be on the ground where teachers work and plan and live than to float around alone among the clouds.

In this third edition, as in the first two editions, the *why* receives more emphasis than the *how*, because from the *why* emerges that force pushing on to the discovery of new and better practices and procedures in the classroom. The importance of the teacher as a cultured individual, a thinker, a planner, a psychologist, a learner, and a well-grounded and well-rounded person is receiving more consideration as the basic factor in teaching. To improve the teacher is to improve instruction. To that end this third edition was undertaken.

Acknowledgment is made to the many authors who have influenced the writer's concepts of teaching and learning. Acknowledgment is also made to the publishers who have so willingly given permission to quote from their publications. But,

most of all, acknowledgment is made to the hundreds of devoted teachers who, by their contribution of ideas and through their demonstrations in teaching, revealed what the principles of teaching are and how they can be fulfilled in classroom instruction.

F. A. B.

STATE COLLEGE, PENNSYLVANIA
March 1954

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension SERVICES
CALCUTTA-27

TABLE OF CONTENTS

PART I

Introduction 3

I. The Increasing Complexity of Teaching 5

II. Thinking through the Principles of Teaching . . 11

PART II

Introduction 27

III. Principle 1: The Objectives Should Be Most Worth While 29

IV. Principle 2: Pupils Learn through Self-activity, but This Activity Should Be Psychologically Sound . . 53

V. Principle 3: Self-activity To Be Psychologically Sound Should Be in Fullest Agreement with the Type or Types of Learning Involved in Attaining the Objectives 66

VI. Principle 4: Learning Should Be Unitary, Not Fragmentary 139

VII. Principle 5: The Energy of Pupils Should Be Released so That They Apply Themselves Fully . . . 149

PART III

Introduction 167

VIII. A Teacher's Important Responsibilities during Teaching Time 169

IX. The Assignment as the Beginning-Point in Teaching . 179

X. The Unit Concept of Planning and Teaching . . . 191

XI. Improving Questions and Questioning 218

XII. Assisting Pupils To Grow through Independent Study 236

PART IV

Introduction 263

XIII. Principle 6: Teaching Should Provide for Individual Differences 265

XIV. Principle 7: Teaching Should Be Diagnostic and Remedial 300

XV. Principle 8: The Physical and Social Environment for Learning Should Be Ideal 324

PART V

Introduction 343

XVI. Drill, Review, Pupil Participation in Teaching, and Radio and Television in Classroom Instruction . . 345

XVII. Social Dynamics in the Classroom 363

XVIII. The Place of Measurement in Teaching 375

XIX. Planning the Teaching 406

INDEX

Index 429

INTRODUCTION

THE two chapters in Part I give a general introduction to the work of the secondary-school teacher. Chapter i is devoted to teaching complexities resulting from situations and problems confronting secondary schools. Chapter ii sets forth eight principles of teaching that give direction and perspective to one who selects teaching in the secondary school as his field of service.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension Services
CALCUTTA-27

CHAPTER I

THE INCREASING COMPLEXITY OF TEACHING

DURING the last two or three decades, requirements for teaching in secondary schools have been increased, and, today, a common demand is four years of preparation beyond the twelfth grade. Frequently, the Master's degree is a prerequisite. Preparation beyond the minimum is always considered favorably. Continuous study on the job is recognized as a part of professional ethics.

Demands for greater preparation signify that teaching is becoming a highly complicated and important service. An examination of the forces which make this service increasingly more complex and significant will simultaneously reveal the obligations of those who are, and those who will be, engaged in secondary-school teaching.

1. *Secondary-school enrolment.*—Enrolment in secondary schools has been startling since the turn of the century. While the general population doubled since 1900, the high-school enrolment in 1950 was about ten times that of 1900. From 1900 to 1930 the secondary enrolment about doubled each decade. Approximately two-thirds of the pupils of secondary-school age are now in actual attendance. It is estimated that the present seven millions will swell to near ten millions by 1960.

Although the picture is pleasing, one serious problem is present—half the pupils drop out before graduation. While there are many and interrelated causes for dropping out, investigations indicate that no interest in school work, dull and uninteresting offerings, failure, dislike of teachers, poor teaching, lure of work outside, and economic pressure are among the most important. These reasons for dropping out warn that all is not well within the secondary schools in this land of equal opportunity for all. If a high-school education is considered a minimum for leading a useful and fruitful life in

this democracy, then society must reckon with this condition. It is more than the concern of only the serious-minded educators.

2. *Changing philosophy of education.*—About 1900 the high school was concerned mainly with preparation for college, and pupils at that period devoted their time to college-preparatory subjects. With the great influx of pupils in the following decades, a changing philosophy of education stressed the point that the children of all the people should be given the opportunity to secure appropriate training in secondary schools. Not only is elementary education considered the heritage of every boy and girl but secondary schooling is also considered their right. Child labor laws, compulsory attendance laws, the demands of the professions and industries, and the prerogatives of youth are making it obligatory for secondary schools to care for more and more of our adolescents. Today, society is demanding more training for its youth and a different kind of training. The high school must afford educational opportunities for those who knock at its door.

The Educational Policies Commission of the National Education Association has developed a program for the education of all American youth, and the National Association of Secondary-School Principals of the same Association has bent its efforts to the task of planning for American youth.[1] Here the philosophy sanctions the belief that all youth should be entitled to secondary education as a right and that this training should be so directed that each youth profits in accordance with his interests, needs, and abilities.

Today the life-span is approaching seventy years, while in 1900 it was about forty-seven. No longer is it necessary for youth to hurry into vocational life. Even the older persons who must retire at sixty-five complain because they still have five or ten years of effective service remaining. This shows why the period of life, at least up to eighteen or twenty, should be devoted to the laying of a sound educational basis for the

[1] Educational Policies Commission, *Education for All American Youth: A Further Look* (Washington, D.C.: National Education Association, 1952); National Association of Secondary-School Principals, *Planning for American Youth* (Washington, D.C.: National Education Association, 1951).

long productive period of adult life beyond the formative period of youth.

3. *Wide range of individual differences.*—The large increase of pupils means that more and more of these pupils come from all levels of our society rather than from the upper level. Not only the able and academically minded section of the high-school population seeks the advantage of secondary education but more pupils from all social and economic levels of society are also seeking more training. In our democracy the high school has become the people's college. While no one would want to see a single person deprived of an education, there still remains the fact that traditional subject offerings must be revised and invigorated and supplemented and that new areas of useful experiences must be added to meet the needs and demands of the millions attending secondary schools.

4. *Problems in secondary education.*—Educational critics have for some time been centering their attack upon secondary education as the division of the school system most in need of vital and far-reaching changes. It is true that high schools have been faced with perplexing problems caused by the great influx of pupils, the needs and interests of the increased secondary population, the demands of a changing social and industrial order, and the conflicting philosophies held by school people as well as by citizens outside school circles. Progress has been made, and more progress will be made. However, not all the problems have been settled, and there will be new problems when the old ones are solved. It is a task of no small proportions to direct wisely and satisfactorily the educational destinies of millions of pupils attending high schools, especially when no other nation in the history of the world has left a precedent by which the United States can guide its own course. Pioneering is the way out.

The Commission on the Relation of School and College of the Progressive Education Association has set forth what it considers some areas in secondary education in need of exploration and improvement.

It seemed to the Commission that secondary education was clearly inadequate in certain major aspects of its work.

1. Secondary education in the United States did not have clear-cut, definite, central purpose.

2. Schools failed to give students a sincere appreciation of their heritage as American citizens.

3. Our secondary schools did not prepare adequately for the responsibilities of community life.

4. The high school seldom challenged the student of first-rate ability to work up to the level of his intellectual powers.

5. Schools neither knew their students well nor guided them wisely.

6. Schools failed to create conditions necessary for effective learning.

7. The Commission was conscious, also, of the fact that the creative energies of students were seldom released and developed.

8. The conventional high-school curriculum was far removed from the real concerns of youth.

9. The traditional subjects of the curriculum had lost much of their vitality and significance.

10. Most high-school graduates were not competent in the use of the English language.

11. The Commission found little evidence of unity in the work of the typical high school.

12. The absence of unity in the work of the secondary school was almost matched by the lack of continuity.

13. Complacency characterized high schools generally ten years ago.

14. Teachers were not well equipped for their responsibilities.

15. Only here and there did the Commission find principals who conceived of their work in terms of democratic leadership of the community, teachers, and students.

16. Principals and teachers labored earnestly, often sacrificially, but usually without any comprehensive evaluation of the results of their work.

17. The high-school diploma meant only that the student had done whatever was necessary to accumulate the required number of units.

18. Finally, the relation of school and college was unsatisfactory to both institutions.[2]

If these conditions prevail—and there is no doubt that they do—then secondary education requires internal reconstruction and revitalization; indeed, it needs continuous rejuvenation, not merely a few pep talks on the first day of the school year.

5. *New emphasis upon objectives.*—Instead of undue emphasis upon facts, rules, formulas, and definitions as routine and memoriter ends in themselves, stress today is placed more upon understandings, applications, and uses of knowledge.

[2] W. M. Aikin, *The Story of the Eight-Year Study* ("Adventures in American Education," Vol. I [New York: Harper & Bros., 1942]), pp. 4–10.

There is so much to be learned that selection of functional knowledge is necessary. In addition, those phases of development as health, citizenship, appreciation, honesty, fair play, and growth of personality must receive their rightful share of emphasis. The intellectual, emotional, physical, social, and spiritual changes should keep abreast all along the line. One must live as well as make a living. Man lives a social and spiritual life as well as an economic life. No longer must education be concerned only with a part of life—learning must include all that leads to a full and useful existence in a democratic society.

6. *Importance of the learning process.*—At one time there was a prevalent notion that command of facts and information was the essential factor in an instructor's qualifications. "He puts his subject matter across" usually resulted in the act of throwing out without consideration of those who were to do the receiving. One does not teach, in a psychological sense, unless learning occurs. More attention is, at the present time, being focused upon the learning process. Hundreds of experiments have been performed to determine the exact mental processes during learning. Scores of courses dealing with the various phases of psychology are offered in colleges and universities. One requirement for teaching should be a broad knowledge of the learning process. Never again will "keeping school" or "keeping order" or "keeping a few pages ahead of the class" be considered an adequate criterion of fitness to teach.

7. *Numerous techniques and plans.*—The procedures employed by classroom instructors in directing the work of pupils are many. Scores of books and thousands of magazine articles contain directions for putting these procedures into practice. Naturally, reasons for the superior effectiveness of each procedure are presented. The beginner is likely to be so confused while reading about the numerous devices and plans that he may not see the woods because of the trees.

One is often led to believe that teaching is a bag of tricks, or the pulling of strings as in a puppet show, or the constant display of dramatic traits. Again it is often considered a book

of recipes, routines, and magic formulas. One hears or reads of this new method and that spectacular device.

Beware of the crystal-ball-gazers! There is no mystery in teaching. Every procedure in teaching should be based on knowledge of human beings, how they learn, how they mature, and how they function physically, mentally, socially, and emotionally. Method should be considered as the science of guiding and directing wisely the powers that pupils actually possess to get along educationally. Method based on any other foundation is an injustice to youth as well as to society.

THE CLASSROOM AS THE FOCAL POINT

The center of the converging forces in the educational system is the classroom. It is here that the demands of society, the new philosophy, the revised curriculums, the findings of experimental research, and the best from experience are utilized and realized in and through instruction. It is here that the learning of millions is directed. It is here that life is real and earnest. The ideas and ideals and proposals so often written on paper must be here impressed upon living tissue. Responsibility is here not an abstraction but a living reality.

CHAPTER II

THINKING THROUGH THE PRINCIPLES OF TEACHING

DO YOU want to know what you will do when you teach? Do you want everything listed? If that were done, there would be hundreds or even thousands of specific activities. Should one attempt to labor along that line, even if he did get every item, he would be in a difficult position when study to do these numerous and specific bits of work was undertaken. Probably the many activities can be grouped under a few large and functional divisions, responsibilities, obligations, or principles. At any rate, a serious attempt to classify the many detailed labors under a few major or inclusive divisions seems necessary before learning to teach can be brought under control.

An analysis of what a teacher does may be profitable as an initial endeavor. You will recall many activities. There will be asking of questions, explaining, demonstrating, giving examinations, assigning lessons, sketching on the blackboard, reading from a book, showing pictures or movies, keeping good order in the room, helping pupils with their difficulties after school, answering questions, keeping the shades adjusted, correcting examinations and notebooks, listing reference books, taking attendance, and many other activities. Would preparation to teach, then, consist merely in learning the techniques to carry out these numerous parts?

One might, to bring in an analogy, try to find out what a physician does by analyzing his activities and then learn to be a physician by doing exactly what he does. He carries a leather bag filled with instruments and little bottles; he looks at the tongue and throat; he asks a few questions about what you have eaten; he inquires about your appetite; he puts a thermometer into your mouth; he looks at the thermometer after a few minutes; he feels your pulse; he moves a stethoscope over your

chest; he gives pills or medicine to be taken before and after meals; he advises you to stay in bed for a few days; he tells you to drink orange juice and eat certain foods; he wants you to call him if you are not better in forty-eight hours; and then he takes his leather case and departs. Can one learn to be a physician by securing a leather bag, by filling it with instruments and bottles, and by learning to do what has been described during the visit with the sick patient? Something seems very unreasonable and too mechanical. What can it be?

Now, going through the motions would be only superficial imitation. One must see and do more and know more than what appears on the surface. He must probe deep, because back of these surface activities are underlying reasons. So, too, in teaching, one must go deep if he wants to find more than external symbols. The activities previously described are only means to fulfil some basic understandings in the fields of medicine or teaching. The search, for our purpose, must now be directed toward the discovery of those basic understandings underlying good teaching. The specific parts have meaning only as they fit into the whole; or, more to the point, the whole determines what uses shall be made of the parts.

Another analogy at this time will help to direct your attention to the major understandings from which teaching evolves. One could study the human body until he had covered the thousands of separate and minute parts, or he could study it in a search for big functions. What do you expect your body to do for you? What does it do? It should help you to walk, play, run, handle tools, and move around in general; this could be called the muscular function or system. The muscular system has many parts, but one can group all these parts under one general and inclusive system called the muscular system. You want your body to maintain its shape, form, and position; this is the skeletal or bony system. You want your body to keep you aware of your surroundings and to help you meet situations—to see, hear, smell, feel, remember, and think; the system that does these for you is the nervous system. Then there are the digestive, respiratory, circulatory, reproductive, excretory, pro-

tective, and glandular systems. Note carefully, however, that, of the hundreds of things your body does for you, all of them can be grouped under ten systems or functions. That is all it does or can or is expected to do.

A better understanding of the human body is secured if it is studied from the viewpoint of functions; the study of the many parts then can be put or placed where they belong under the few basic functions. One may study about the kidneys yet never become aware of the teamwork of a group of organs, including the kidneys, that eliminates waste materials from the body. Furthermore, while studying the excretory system, one realizes that some other system or systems must have supplied the body with original materials or there would be no waste products—the digestive and the respiratory systems are immediately brought to mind. The understanding of the systems and of the interrelationships among them constitutes one inclusive concept of the work of the human body.

Teaching likewise should be studied from the standpoint of major functions rather than as hundreds of disunited activities. What are the major functions that comprise teaching, or what major responsibilities are involved in the process of doing effective and complete teaching in the classroom? Instead of using the term "function" or "responsibility," the term "principle" will be employed because it designates a generalization that gives direction to thinking and planning and acting. The question can now be worded: *What are the principles of teaching that should be understood and fulfilled in the everyday instruction of the classroom teacher?*

THE PRINCIPLES OF TEACHING

Project your vision and see yourself as a salaried teacher, hired as one qualified to do a professional service, now standing before a class of thirty pupils whose education and learning you are to guide wisely and profitably. What are your obligations to these young persons? Do you have firmly in mind the big ideas about teaching around which your services will center? Surely, the quickest way to direct your attention to the big ideas would be

to list them at once. But is there not a better way? Is there not some way to have you participate in the discovery of the major divisions of labor in high-school teaching so that you feel and appreciate your present and future responsibilities more keenly and personally?

1. The initial inquiry might be: Why are these pupils here in the first place? An analysis of this question reveals that in thousands of classrooms throughout the country similar groups are meeting with their teachers. About seven million young persons are attending secondary schools in the United States, or approximately two-thirds of our boys and girls of secondary-school age are actually in these schools. Why are they there? Well, the parents of these youth are immensely concerned over the development of their children, the kinds of lives they will lead, and how they will make a living. Then the community and the state are directly involved in the civic and moral qualities of the citizens of tomorrow; in fact, societies from the little family gathering up to the national group are forever thinking of the present and future welfare of their members. The pupils in your classroom are there because the society of which they are a part believes that education is needed to live and to make a living, to meet the problems of life, and to discharge social responsibilities. Pupils come to school to be changed, to grow and develop in certain ways, and to have their behavior directed and improved.

Youth is ushered into a complex world, but nature provides them with very few and very simple abilities. They must acquire many more. What are those abilities which seem to be important? Who shall determine which abilities are most important? It seems likely that some abilities may be almost useless even if they are acquired and that some others not acquired may prove to be indispensable. Life is short and the world is growing more complex daily. Which objectives shall be set forth as the best ones to be attained by our secondary-school pupils? Society depends upon its teachers to help in this important undertaking; it hires its instructors to think about, to select wisely, to emphasize, and to teach whatever leads to the greatest and most profitable development of its youth. So significant is this responsibility in

the work a teacher does that we can set it out by itself as a guide to remind her again and again of its importance and urgency. It is one of her major tasks as a teacher. It is an ever present part of all that she does when she teaches. It is a principle of teaching. THE OBJECTIVES SHOULD BE MOST WORTH WHILE.

2. Following the determination of objectives, the teacher must necessarily consider other teaching responsibilities. Objectives jotted down on paper or resting within the teacher's mind will avail little—they must be translated into behavior changes in pupils. Quite fruitless would it be to have pupils sit and dream about what they should know or be or do. Sitting and dreaming never made pupils able to do anything better except to sit and dream. Something must be done by pupils before theoretical objectives become real possessions. One may realize how good the ability to sing would be, but the wish does not make him a good singer.

Right at this stage of a teacher's work comes that pressing and ever present problem of learning. So involved is learning that clear thinking and sound judging about how one learns should be the next consideration in figuring out what a teacher does. This part of a teacher's work is so important that it is necessary to keep several phases of learning in mind.

One of these parts goes directly to the heart of all learning. A person may be able to buy many things in life, but there is one thing he cannot buy. He cannot buy it from the teacher or an institution of learning. That one thing is education, the products of learning. For that he must work, study, read, think, exercise, and put forth efforts of many kinds. But, in every case, he gains and grows only to the extent that he exerts himself. There is no other way. Out of this fact emerges another guide or principle of teaching: PUPILS LEARN THROUGH SELF-ACTIVITY, BUT THIS ACTIVITY SHOULD BE PSYCHOLOGICALLY SOUND. Not only should teachers realize that self-activity is basic but they should also know that some kinds of activity are more effective than others.

Later in this book the concept of self-activity will be developed at greater length, but at present you should begin to realize the significance of reactions in learning, for without reaction or

activity by pupils nothing can be accomplished, regardless of the effort put forth by the teacher. If the importance of self-activity is overlooked or neglected, teaching goes astray at innumerable points.

3. After the realization that all persons, pupils included, learn through their own efforts and that this activity should be sound, another responsibility of the instructor is to determine just what activity she will bring into play so that the learning will be psychologically sound. Suppose pupils are to learn the names of the Great Lakes. Notice that the objective here is to learn the *names* of the five lakes. These names may be given orally; written on the board; a device such as HOMES, in which each letter stands for a lake, may be given to assist in the learning; the names may be volunteered by pupils and, when confirmed, written into notebooks; or pupils may find the names in a geography book. The next day each pupil in class is able to give the names of the five lakes without an error. At this point all members of the class are sent to the blackboard or are given blank sheets of paper and asked to sketch a map of the United States and put in the Great Lakes. Suppose that pupils are unable to indicate the geographical location of the lakes or their relative positions with respect to one another. How can this inability of the class to sketch the location or positions of the Great Lakes be explained? Well, the pupils did work faithfully because they memorized the names and were able to repeat them the next day. Certainly it was not a matter of self-activity because effort enough was made to remember the names. The soundness of the activity cannot be questioned as far as the objective was concerned. Why, then, did not the pupils know enough to sketch a map and give the general location and relative positions of the lakes? One can see even now that memorizing as a type of learning has its limitations, and it is the duty of an instructor to know that the psychological soundness of an activity must always be determined by the nature of the objective. In this case, pupils did not realize that they were to sketch a map and put in the Great Lakes; therefore, they were unable to do so no matter how hard they memorized the names. Naming is not the same as locating. To be

able to do the mapwork, another kind or type of learning was necessary—a type that we will call "sensory experience." So it appears evident that the soundness of activity must be determined by what is set up as the objective to be attained. SELF-ACTIVITY TO BE PSYCHOLOGICALLY SOUND SHOULD BE IN FULLEST AGREEMENT WITH THE TYPE OR TYPES OF LEARNING INVOLVED IN ATTAINING THE OBJECTIVES.

Types of learning are general divisions into which learning falls. As used in this book, these types are sensory experience, memory, motor, problem-solving, and emotional. Later these types will be explained and their respective uses illustrated.

4. While learning thus far has been considered as a progression from general activity and the psychological ways or types of learning, there is another phase of learning that should go on at the same time. The part to be treated at this point is very important and is frequently missed or neglected by pupils; therefore, the teacher must direct pupils' thought and effort so that it is not overlooked. Sometimes a fragment or item is learned, and the pupil believes that he has reached the end. Why did you learn that the principal parts of the verb GO are *go, went, gone?* He will probably say that the teacher wants us to know them, that they will be in the examination, or that they were in the assignment. He learns them as fragments, as isolated bits of school work, as a separate and specific series of three words. He may not be conscious of their use in his speaking on the playground, in speaking to his mother, or in writing a letter or examination. He may not group this verb with hundreds of others used in his daily conversation. He may not realize how he is growing in power to express himself according to conventional usage or how he is improving his growth in the understanding and application of the English language. It is a principle of teaching to direct learning toward meanings, relationships, applications, organizations, and structures. This principle of teaching is: LEARNING SHOULD BE UNITARY, NOT FRAGMENTARY.

5. Now, learning is work, and, whenever human beings spend energy in some kind of undertaking, there are bound to be many factors that might lead to delay, procrastination, loss of interest,

boredom, and slackening of effort. If these factors causing individuals to be halfhearted and lackadaisical about their work are not corrected, no full measure of accomplishment can be expected. One might just as well view pupils as they are; they do get discouraged, they do often see little value in their labor, they do get bored. They need to be stimulated and motivated. Life in school is not a bed of roses—there is work to be done, and without effort no learning can take place. The teacher must help pupils to want to learn; she must do all within her power to create the right spirit on the part of those she teaches. THE ENERGY OF PUPILS SHOULD BE RELEASED SO THAT THEY APPLY THEMSELVES FULLY. This is another responsibility in teaching, another principle of teaching.

6. In this class you will find numerous differences. Pupils are not as alike as peas in a pod. Some will show striking differences in physical appearance, in health, in height and weight. Their ages will not be the same. Many will be sensitive, while others will be hard and tough emotionally. What will be difficult for some pupils to learn will be very easy for others. Their backgrounds will vary. A few may read as well as college students, while others may not read any better than pupils several grades below them. It seems reasonable to surmise in such a situation that teaching must be more than the same educational diet and treatment prescribed rigidly for the group as a whole. TEACHING SHOULD PROVIDE FOR INDIVIDUAL DIFFERENCES.

7. Learning in school, like learning in other places, does not proceed evenly and smoothly in spite of desire to learn. When the real job of trying to achieve some goal is undertaken, one will find many obstacles along the road leading to that achievement. At times a special heave of effort will overcome some difficult material, but at other times the difficulty cannot be surmounted. When the learning runs head on against some perplexing situation, and no progress, regardless of effort, results, then the time for some guidance is in order. When an individual, to use an analogy, is ill, he may be helpless in determining what the trouble is or how to correct it. So, too, the pupils may not know why they cannot progress or what to do about it. At this

point the teacher can fulfil an important responsibility; she can diagnose the causes of no progress and prescribe remedies. If she does not or cannot do these complex activities, who will do them? Indeed, she must be able and willing to perform them. GOOD TEACHING IS DIAGNOSTIC AND REMEDIAL. This is the seventh principle of teaching.

8. A group of pupils and the teacher working together are a little section of society. Quite naturally, the one adult in the group because of her knowledge, experience, and delegated authority is expected to guide this little society in a diplomatic way and to provide conditions that will be ideal for work and cooperative efforts. Such physical conditions as light, heat, ventilation, and other factors in the physical environment should be regulated so as to secure the best results while pupils are working. Unless there is some degree of quiet and self-control by all members of the group, serious and profitable study will be hindered. If a pupil is fearful of the teacher, he will be emotionally strained and may not work effectively as an individual or as a member of the classroom group. It is the teacher's obligation, therefore, to keep the environment conducive to best effort. THE PHYSICAL AND SOCIAL ENVIRONMENT FOR LEARNING SHOULD BE IDEAL.

You are now in a better position to answer the question: "What does a teacher do when she teaches?" Instead of thinking of teaching as a very long list of specific things a teacher does, you see classroom instruction as a few important and significant responsibilities that encompass everything that she does. Furthermore, these few responsibilities also include what she should do; they serve as guides in the study of one who is preparing himself to teach. For purposes of teaching as well as preparation for teaching, these eight shall be called *Principles of Teaching*. Teaching, after all, is the intelligent fulfilment of these principles.

The analysis of teaching, as attempted in the first part of this chapter, began with a partial list of what a teacher does. One of those activities was: *she asks questions*. In analyzing the activities of a physician, also in the first part of the chapter, it was

found that he, too, asked questions. Now, the asking of questions is only a means used to fulfil major responsibilities of both the teacher and the physician. Those major responsibilities are important to know and understand. Questions, assignments, examinations, and hundreds of other teaching devices are only means to teach out the major guides, or, as will be used hereafter, *principles of teaching*. Before one can use means intelligently, he must know what he is trying to accomplish; a means is used because it finds a place or use in working toward the accomplishment or goal. The goals here are the abilities to understand and teach out the principles of teaching.

Meaning of principle.—Learning of many skills, facts, and ideals goes on during the process of living, without the guidance and direction of others; but, because society does not believe that its children can learn enough in this manner, it has made provisions to employ trained individuals to facilitate the educational progress of its offspring. Payment for the service involved in directing educational progress implies that the service rendered should influence growth much more than if improvement were merely left to itself. Effective teaching influences learning, but effective teaching results from the use of fundamental principles. A principle, then, is a guide which keeps instructional activities pointed in the right direction. If persons are hired to discharge faithfully and effectively the responsibility of guiding children's growth, then the persons so paid must know the principles involved in their work as instructors. Effective teaching, in the final analysis, is the utilization of basic principles in directing the learning of others.

Although principles proposed by authors will not be exactly the same, there is a tendency among recent writers to stress principles. Witherington writes:

> Through many years of experience in the education and training of teachers, the author has come to the conclusion that prospective teachers need not so much a body of learnings about professional matters as they do a sound basis of principles upon which to build a system of teaching. Unless teachers master such fundamental principles, they tend to acquire in their

professional studies merely a quantity of specific learnings which amount to little more than a book of recipes. As a result, they are wholly unprepared to deal with professional problems on a rational basis.[1]

SUMMARY

During this mental journey through the complete teaching act, eight principles of teaching should begin to stand out in your mind. Many days filled with serious study and reflection will be required before you have a profound working knowledge of these principles. Many persons try to learn how to teach without making a serious attempt to see the complete teaching process. Unless you do visualize the ends underlying your study, you will not have purposes in mind giving direction to the knowledge gained and the ways it can be applied. The intention of the author is to have you see the scope of teaching first, and then you can add the supporting details gradually.

The eight principles are really your teaching responsibilities. Become aware of the existence and importance of these eight from the beginning, and whatever you study thereafter can be brought in to develop a better understanding of your obligations, as teachers, to adolescent youth.

You have probably noticed that the eight principles lean heavily upon educational psychology, especially upon those divisions pertaining to types of learning, motivation, and individual differences. This is as it should be. Teaching is the influencing of educational growth, and this growth depends in large measure upon how learning is directed. What should be learned is not the problem of psychology, so it is necessary for every teacher or prospective teacher to be a keen student of our present-day living requirements which involve the social, economic, political, moral, recreational, and religious aspects of modern life. Since living requirements change, so must the objectives of education change. The more substance teachers get into their minds about objectives and how those objectives are attained,

[1] H. C. Witherington, *The Principles of Teaching* (New York: Prentice-Hall, Inc., 1939), p. v.

the more substance there will be in the teaching process. Teaching should never become the mechanical carrying-out of traditional techniques or the manipulation of classroom work by rule-of-thumb procedures. Teachers should be conscientious about principles and the intelligent fulfilment of them. Teachers should know where they are going and how to get there. The more scientific instruction becomes, the less dependence will there be upon trial-and-error practices.

It will be profitable for you to review the eight principles of teaching:

1. The objectives should be most worth while.
2. Pupils learn through self-activity, but this activity should be psychologically sound.
3. Self-activity to be psychologically sound should be in fullest agreement with the type or types of learning involved in attaining the objectives.
4. Learning should be unitary, not fragmentary.
5. The energy of pupils should be released so that they apply themselves fully.
6. Teaching should provide for individual differences.
7. Teaching should be diagnostic and remedial.
8. The physical and social environment for learning should be ideal.

So numerous, complex, and bewildering do the responsibilities of secondary-school teachers become that some general guides should be furnished to give direction and balance and inclusiveness to classroom activities. The guides can be called principles of teaching, and these principles are derived from a knowledge of the natures and capacities within, and from the study of conditions and circumstances in the environment of, the individuals who compose the secondary-school population.

Learning to teach begins not in the accumulation of countless bits of unrelated information but rather in the grasping of those basic principles supporting good teaching anywhere and everywhere. Growth thereafter is fundamentally the broadening and deepening of their meanings and applications. The remainder of this book is an attempt in that direction.

APPLICATION EXERCISES

1. Would you be willing to say that a person having a knowledge of operating instruments could perform a surgical operation successfully?

Would you maintain that a teacher who knows her subject matter knows how to teach? Justify your answers.

2. Is the person who knows the chemistry of foods necessarily a good dietician? In what way, if you answer in the negative, does the chemist fall short?
3. Examine the principles of teaching again and then recall your learning in elementary, secondary, and college subjects. Can you remember some teachers who failed to fulfil some of the principles? Which principles were most often overlooked? What effect did the oversight have upon your educational progress?
4. If you were to substitute a few days for some high-school teacher, which principles do you believe would be inadequately taught out by you? Why?
5. Some books in methods of teaching have chapters dealing with almost every conceivable phase of instruction, ranging all the way from erasing the blackboards to directing the appreciation lesson. These chapters, moreover, follow one another in any order. Lesson planning is as likely to be the first chapter as the last. Should there be some unity in learning how to teach? Explain.
6. Here are a few means frequently used to teach out principles. Can you tell which principle or principles might be most directly related to these means?
   a) Making an assignment
   b) Giving an examination
   c) Showing a movie
   d) Having an oral report by a pupil
   e) Demonstrating before the class
   f) Having pupils do experiments in the laboratory
   g) Having a period or two for review at the end of a course or semester
   h) Keeping the shades properly adjusted
   i) Being patient and helpful when pupils display little or no understanding of a difficult problem
   j) Giving a good illustration

RELATED READINGS

GOETTING, M. L. *Teaching in the Secondary School,* chap. x. New York: Prentice-Hall, Inc., 1942.

MACOMBER, F. G. *Teaching in the Modern Secondary School,* chap. ii. New York: McGraw-Hill Book Co., 1952.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chaps. iii–iv. New York: Appleton-Century-Crofts, Inc., 1948.

WITHERINGTON, H. C. *The Principles of Teaching,* chap. v. New York: Prentice-Hall, Inc., 1939.

NOTE

Supplementary material found in related and educational journals is so important that prospective or experienced teachers should study this source to supplement the text. The *Education Index* should be used con-

stantly. The *School Review* contains excellent lists of carefully selected articles covering ten areas written during the preceding year; the February and March issues have selected references related to instruction in the regular and the special high-school subjects, respectively. Many of the books in the "Related Readings" have quite extensive lists of good magazine articles.

The sources mentioned are intended to point the way, not to end the journey. It will prove beneficial educationally and professionally to develop knowledge of where materials can be found and the habit of consulting these sources. It would be profitable in teacher-training institutions for the instructor to take his students to the library where he or the librarian could point out the various avenues to educational and professional writings.

INTRODUCTION

THE first five principles of teaching are developed in Part II. These five form a kind of quintet and are so basic in all instruction that they are treated as a group. Teaching, if it is to have any worthy degree of effectiveness, must contain these five. Objectives, self-activity, types of learning, unitary learning, and the release and application of energy are the minimum essentials in any plan of directing classroom activities. The five principles are presented in the foregoing sequence in the next five chapters.

CHAPTER III

PRINCIPLE 1: THE OBJECTIVES SHOULD BE MOST WORTH WHILE

IN THE preparation of teachers as much or more attention should be given to what pupils learn as to how they learn. No matter what method may be used or how effective it may be, there will be no advantage to the learner unless what he gets from the effort expended is relatively useful and significant. This problem of the relative importance of objectives has had a long history, and, if human beings think about and plan for the welfare of their youth, that history will continue indefinitely. Children will be considered our most precious resource. While some of our people will plan to make changes in the wearing qualities of alloys and metals, to improve the soil and conserve it, to devise new machines and discover synthetic products, or to find a more destructive explosive, other persons will plan to bring out better and richer and more essential qualities in human beings. Desirable changes and transformations in pupils are the aims of our schools.

It is difficult to imagine teaching bereft of worth-while objectives being effective unless one is willing to overlook results and focus attention upon pure method without reference to what comes out of method. As far as pupils are concerned, something of real value should emerge from method, otherwise the effects of instruction are flat and fleeting. What shall it profit pupils if they work conscientiously and then find themselves useless and helpless in a demanding world! Those who attend schools have a right to expect value in return for their time and effort. To whom shall they look and in whom shall they trust for a square deal in this respect? Teachers, in large measure, must assume this responsibility for those unable to do the selecting for themselves. Selection of the most worth-while objectives is a principle of teaching, and it is one of the most important.

Clarification of terminology.—Various terms are used in educational literature to express what should appear as the results of schooling. Among the most commonly used terms are "ultimate objectives," "general objectives," "goals," "outcomes," "ends," "aims," "objectives," and "purposes." Since there are no restricted meanings attached to some of these terms and because most of them are synonyms, a little distinction is needed to hold meanings within bounds. Broad results, such as good citizenship and worthy home membership, should be called "ultimate objectives" or "goals" because these results extend beyond the years of formal schooling; we might say that the two objectives are always before one as long as he lives. Results attainable in shorter spaces of time—during a class period, a week, or a semester—should be called "objectives," "aims," "outcomes," or "purposes." These terms are really synonyms, and they add variety without changing meanings materially. In this book the long-time results showing the direction in which education should move are called "ultimate objectives" or "goals," while the more restricted or shorter-time results are called "objectives" or "aims" or "outcomes" for the most part, with occasional use of synonyms for variety in expression.

The problem in perspective.—Whether or not the word "objectives" was employed to designate the results of learning, every clan, tribe, or people has striven to exert an influence upon its youth, that is, to bring the new generation up to certain needed levels of living. The Indian boys were trained to make bows and arrows, to shoot accurately, to hunt, to fish, to paddle a canoe, and to do many other things needed in their lives. Objectives were few and quite simple for this primitive people.

In modern times the American boy or girl faces a civilization of enormous complexity; literally thousands of abilities are required to meet adequately the humblest kind of existence. Objectives are sometimes not easily determined, and great difference of opinion exists as to those most worth while. Frequently, our established ways of life persist while our environment creates new needs; often new demands conflict with cherished customs and institutions; at other times the way seems confused and

complicated by problems for which no ready solution is known. It is just this state of affairs which makes it imperative to exercise the maximum degree of discrimination humanly possible in deciding what is best for the recipients of instruction.

In our early history, schools were few in number; but, as time elapsed, the number increased, and the divisions such as the kindergarten, the elementary, junior and senior high school, the junior college, and the higher institutions of learning evolved, each one being responsible for certain purposes. While a secondary-school teacher should know in general the purposes of the various schools, she must know as a matter of professional preparation the purposes of the junior and the senior high schools and particularly the objectives of the subjects or fields she teaches.

Evolution of secondary-school objectives.—The first secondary school in this country was the Latin Grammar School, a school established to prepare boys for college; the college, in turn, had for its original purpose the preparation of young men for the ministry. In Colonial days life was comparatively simple; only a few professions required extended training, the ministry being the one of first importance. While reading, try to imagine the status of society at that period, for without this knowledge of early society the forces at work determining the trends and developments in education today will not be fully comprehended.

As society became increasingly complex, more training was needed to cope with the complexity than the educational opportunities of the day afforded. Commercial and economic factors became more prominent. The body must be nurtured as well as the spirit; man must make a living in order that he may live. As this urge for more training in new walks of life became stronger, another school of secondary nature was founded—the academy. The academy must not be mistaken for a revolution in education; it was merely an addition to care for the demands which were not satisfied in the established institutions of the time. In the academy more emphasis was placed upon what many call the "practical needs," such as the commercial, business, legal, and professional courses. Surveying, mathematics,

English, business law, economics, and other practical subjects were offered. For the first time educational opportunities in more advanced courses were offered to girls. As a rule, the academies were private schools, and fees were paid by those in attendance.

Students of education are not so much concerned with the name of an educational institution as they are with the forces which give impetus to educational evolution. Historically, needs are first felt by a people, and then means are devised to meet the needs. The academy was a means to promote training required by a changing environment. One can see in the rise of secondary schools the importance of aims as the most significant cause of educational change.

In 1821 another school—the high school—made its appearance. Its establishment resulted from forces acting from several directions. There was a belief that society as a whole should offer high-school education to all who desired it and, furthermore, that more stress should be placed upon those phases of education beneficial to the majority and not only to the fortunately situated. Here was an attempt to administer to the development of all youth and to make this possible by public support. Faith in secondary education which started then has continued without diminution, and indications point to an even greater faith in the coming decades. Boys and girls of secondary-school age should be afforded the opportunity to develop into happy and useful individuals, for their own good and for the welfare of society. To facilitate this development, our citizens are paying continuously and abundantly to establish more schools, and better schools, not only for secondary pupils but also for those in lower and higher divisions of the educational system.

ULTIMATE OBJECTIVES OF SECONDARY EDUCATION

The fact is there is so much to learn and there is not enough time to learn all of it. It would take one person about four hundred years to complete the subjects offered in a large university. To complete all the courses given in some of our largest high schools would require sixty years of study by one individual. Imperative is it, then, to do some clear thinking about and careful selection of the general and specific aims of secondary education.

Two trends seem to be followed in recent work on the problem. One relates to the selection of objectives that meet the common needs of all pupils, and the other to the needs of particular individuals. The first of these two is incorporated in the core curriculum which is required of all pupils, and the second takes the form of elective courses or curriculums to meet the special requirements of individual pupils or particular groups.

Objectives common for all.—Observation of a section of society should bring to light some common needs. Everyone needs to talk, read, write, protect himself against accidents, take care of his body, and mingle with other persons; these are examples of a very few common abilities everyone should possess if he intends to live at all effectively with his fellows. A long list of common needs could be given now, but the logical way is to search for larger classifications of needs. This is the first task. If this part is done well, the larger needs can be studied and their supporting parts determined. What is wanted here are the major groups of common needs or ultimate objectives.

Although the ultimate objectives had received the attention of educators for many years, an epochal and far-reaching formulation was issued in 1918 by the Commission on the Reorganization of Secondary Education of the National Education Association entitled *Cardinal Principles of Secondary Education.* One of those principles stressed seven objectives of secondary education: (1) health, (2) command of fundamental processes, (3) worthy home membership, (4) vocation, (5) citizenship, (6) worthy use of leisure, and (7) ethical character.[1]

The former superintendent of schools of New York City writes thus:[2]

> Character building has been the chief aim of New York City's public schools. All else is secondary, because without character a man is lost irrespective of how much he may know or what abilities he may have. Character is that which impels one to use his knowledge and ability unselfishly for the advantage of his fellow-men, rather than selfishly to their disadvantage. Character building will continue to be the chief aim of our schools.
>
> While unforeseeable things have happened and events beyond our

[1] *Cardinal Principles of Secondary Education* (United States Bureau of Education Bull. 35 [Washington, 1918]), p. 11.

[2] J. E. Wade, "Peace: A Challenge to Educators To Teach Truth of Universal Brotherhood," *New York Times,* September 9, 1945.

imagination have taken place within the past few weeks, we believe we can solve our problems by adherence to basic principles. They are embodied in what we have set forth as our aims:

To build character, instill a love of country and a love for one's fellow-men.

To develop a sound mind and body.

To achieve a mastery of the fundamentals—the three R's.

To discover and develop individual aptitudes.

To cultivate the habit of critical thinking.

To understand and practice desirable school and community relationships.

To appreciate and take part in worth-while activities in and out of school.

Even with the changes that have come to pass and with all the reappraisal and reorientation that may be necessitated by the ending of the war, the foregoing objectives will stand. With these ever in mind we are in a position to make whatever readjustments the times may require.

Common learnings have been grouped by the National Association of Secondary-School Principals under ten imperative needs of youth of secondary-school age as follows:

1. All youth need to develop salable skills and those understandings and attitudes that make the worker an intelligent and productive participant in economic life. To this end, most youth need supervised work experience as well as education in the skills and knowledge of their occupations.
2. All youth need to develop and maintain good health and physical fitness.
3. All youth need to understand the rights and duties of the citizen of a democratic society, and to be diligent and competent in the performance of their obligations as members of the community and citizens of the state and nation.
4. All youth need to understand the significance of the family for the individual and society and the conditions conducive to successful family life.
5. All youth need to know how to purchase and use goods and services intelligently, understanding both the values received by the consumer and the economic consequences of their acts.
6. All youth need to understand the methods of science, the influence of science on human life, and the main scientific facts concerning the nature of the world and of man.
7. All youth need opportunities to develop their capacities to appreciate beauty in literature, art, music, and nature.
8. All youth need to be able to use their leisure time well and to budget it wisely, balancing activities that yield satisfactions to the individual with those that are socially useful.

9. All youth need to develop respect for other persons, to grow in their insight into ethical values and principles, and to be able to live and work co-operatively with others.
10. All youth need to grow in their ability to think rationally, to express their thoughts clearly, and to read and listen with understanding.[3]

The Commission on Life Adjustment Education for Youth, in response to the question, "What is life adjustment education?" answered by saying:

1. It is concerned with ethical and moral living and with physical, mental, and emotional health.
2. It recognizes the importance of fundamental skills since citizens in a democracy must be able to compute, to read, to write, to listen, and to speak effectively. It emphasizes skills as tools for further achievement.
3. It is concerned with the development of wholesome recreational interests of both an individual and social nature.
4. It is concerned with the present problems of youth as well as with their preparation for future living.
5. It recognizes the importance of personal satisfactions and achievements for each individual within the limits of his abilities.
6. It respects the dignity of work and recognizes the educational values of responsible work experience in the life of the community.
7. It emphasizes active and creative achievements as well as adjustment to existing conditions; it places a high premium upon learning to make wise choices, since the very concept of American democracy demands the appropriate revising of aims and the means of attaining them.
8. It is education fashioned to achieve desired outcomes in terms of character and behavior. It is not education which follows convention for its own sake or holds any aspect of the school as an end in itself rather than a means to an end.
9. Above all, it recognizes the inherent dignity of the human personality.[4]

Many other lists of ultimate objectives could be cited; however, the general areas of life covered in the proposals are very similar to the seven objectives found in the Cardinal Principles of Secondary Education issued in 1918. The vocabulary is different, but the essence is almost the same. Some lists contain

[3] National Association of Secondary-School Principals, *The Imperative Needs of Youth of Secondary-School Age* (Bulletin of the National Association of Secondary-School Principals, Vol. XXXI [Washington, D.C.: National Education Association, March, 1947]).

[4] Commission on Life Adjustment Education for Youth, *Vitalizing Secondary Education* (Washington, D.C.: Federal Security Agency, Office of Education, 1951), pp. 32–33.

more objectives, but these objectives in reality are only subdivisions of larger ones. Rational thinking is one of the fundamental processes, probably more fundamental than spelling or writing, or it might be a phase of citizenship or ethical character. Respect for the rights and property of others could be included under good citizenship or worthy home membership. No definite line can mark the place where ultimate objectives end and specific aims begin. In the attempts to give direction to education by setting forth goals or ultimate objectives, the persons engaged have generally kept their investigations and researches focused upon the one problem of life and living.

Can it be possible that living is so mysterious and mythical as to defy analysis? It is complex, yet if schooling is to be most profitable, the learners must secure the vital and necessary educational armor to meet successfully the major tasks of life. Unless goals are singled out, the work of schools will be without direction; goals should be in mind, otherwise the means have no foundation upon which to rest. Teachers should realize fully just how each day's learning helps to prepare pupils for present and future living, and this cannot be done unless the goals which give direction to daily work are clearly visualized. The ultimate objectives aid in directing learning. Time and circumstances will change these goals and account for new ones; but, in any event, learning should be guided toward the most worth-while ultimate objectives. Pupils study to reach useful destinations; they should not spend energy and time traveling roads that lead to barren fields.

ULTIMATE OBJECTIVES GRADUALLY ATTAINED THROUGH SPECIFIC OBJECTIVES

Up to this point objectives have been viewed in a philosophical or sociological manner, that is, the views are expressed as the philosopher or sociologist would like to see secondary education planned and directed. Before the ultimate goals can be attained to a very high degree, many lesser or specific objectives which make the attainment of the goals possible need to be carefully selected. In geometry we say that the whole is equal to the sum

of its parts, so with an ultimate objective we can say that it, too, is equal to the sum of its parts.

Citizenship attained gradually.—How the attainment of an ultimate objective is effected by means of specific aims can be readily seen by starting with the ultimate objective and then working toward the finer aims which contribute to the realization of the final goal. Citizenship is taken as an ultimate objective. What are the lesser abilities composing good citizenship? What more should high-school pupils know and do to be good citizens? What does society demand in the way of citizenship from its members? While trying to answer these questions, one may analyze, he may investigate, he may interview ideal citizens, he may tabulate the shortcomings of citizens, and he may have opinions of his own. Many persons may co-operate to find what traits and abilities make for good citizenship.

A great city newspaper recently had a half-column headed: "8,000 Teachers Meet To Discuss Aims of Social Studies." If you were one of the speakers to appear before this group, what aims would you stress? If you are not preparing to teach social studies, imagine yourself, before some group, expressing what you hold as valid aims for the subject you are preparing to teach. The eight thousand teachers were concerned with aims; indeed, every beginning or experienced teacher should be. One cannot teach that which is not in his mind. Enrich the mind, and teaching will be enriched. Probably some speaker at the gathering might have arisen before that large group and said, "Ladies and gentlemen! In my humble judgment, the twelve major aims of social studies are:

1. To create a sympathetic understanding and appreciation of the peoples of the earth as they are confronted with problems, internal and external, which have grown out of historical, geographical, and political factors
2. To give children that geographical and historical background which will assist in the understanding and solution of many problems of the past and of the present
3. To give a better understanding of and respect for the peoples from various nations who have come within our national boundary lines
4. To give the adolescent child an understanding of the interdependence of nations in this day of almost instant communication and rapid transportation

5. To compare other nations with the United States whenever possible
6. To give ability to use tools of various kinds, such as maps, graphs, encyclopedias, the *Readers' Guide,* and other books of reference
7. To make the child familiar with the great amount of social studies material to be found in current magazines and newspapers
8. To show the great need for the conservation of the world's human and material resources
9. To learn how to work together in contributing to the solution of a common problem
10. To train and develop the citizenship qualities of tolerance and open-mindedness
11. To challenge, compare, and evaluate the facts under discussion
12. To give training in mental integrity and suspended judgment[5]

These twelve illustrate the trend toward more definite and refined aims; they show the result of analysis. Intelligent citizenship cannot be attained as an ultimate objective without first finding the parts. The eight thousand teachers in all probability thought about the relatively large parts, such as are illustrated, but, in so doing, more definiteness and refinement of ultimate objectives have been achieved. What is more, these teachers were attempting to find the real contributions that their subjects (social studies) should make. But why should these teachers be concerned with the aims of their subjects?

The illustration shows the constant endeavor of educators to analyze intelligent citizenship, to see its important parts, and to find aims which function most effectively in building the parts comprising the ultimate objective. As the analysis of the parts constituting good citizenship continues, it becomes more refined and definite until the daily aims are decided upon. If protection of life and property is a larger part of good citizenship, then a daily teaching aim might well be the securing of information and the initiation of an ideal leading to the consideration of the well-being of others when one has a contagious disease. The person who attends a movie when he has a bad cold and sneezes and coughs unashamed upon the necks and into the faces of those around him, or the person who attends school when he has

[5] These twelve are objectives of a unit course in social studies in the Horace Mann Junior High School taken from the Department of Superintendence, Fifth Yearbook: *The Junior High School Curriculum* (Washington: National Education Association, 1927, p. 253).

chicken pox, is not an ideal citizen. The aim for the day may be considered the end of thinking from the general to the specific, and the beginning of thinking from the specific to the general. One must be able to start at either end and see his way clearly to the other end. Life is at one end; daily classroom learning is at the other.

Specific objectives in health.—How does one determine just what the specific objectives shall be? This is an extremely hard question to answer; however, it must be answered and answered carefully and thoughtfully. The demands of life, the conditions in our civilization, and the needs of individuals and society surely must be considered.

The Census Bureau, in announcing its final figures for 1950 on the civilian death rate in the United States, presents data which could be considered in determining some specific objectives in health. Deaths from the five leading causes were: diseases of the heart, 535,920; malignant neoplasms, 211,090; vascular lesions of central nervous system, 156,513; accidents other than motor vehicle, 57,043; influenza and pneumonia, 47,093. Total deaths from all causes were 1,456,000.

The ten leading causes of death and their rates per 100,000 estimated population were:

1. Diseases of the heart, 354.4.
2. Malignant neoplasms, 139.6.
3. Vascular lesions of central nervous system, 103.5.
4. Accidents other than motor vehicle, 37.7.
5. Influenza and pneumonia, 31.1.
6. Hypertension, without mention of heart and general arteriosclerosis, 28.4.
7. Tuberculosis, all forms, 22.2.
8. Motor vehicle accidents, 22.1.
9. Senility and ill-defined conditions, 17.3.
10. Chronic nephritis, 16.9.

Some of the principal causes of death in our country are here presented. If it is considered urgent to decrease the death rates of some or all of these causes, then action is required. At what ages do the deaths occur? Do some of these diseases begin early in life, and, if so, what can be done to prevent or check them? Do we eat the right foods, get enough exercise, and do the right

things? We hear much about motor accidents, but the other accidents take about two times as many lives. Are we too careless or too poorly informed? Should we have more safety education taught in our schools? Just what should be taught? It is known that an enormously large percentage of deaths from accidents occurs in the home. Several specific objectives, then, for this restricted area could be those abilities which one should have in order to keep alive, or at least to keep from bodily injury, in his own home.

Specific objectives important.—Good judgment and the best scientific procedures should play prominent parts in finding specific objectives leading to the fulfilment of ultimate goals. Many questions need to be answered. What kind of education is paramount in preserving and perpetuating democracy? What are the obligations of secondary schools in preparing youth to cope with international relationships and problems of peace? Then there are questions about vocational training, amount of grammar to be taught, how much mathematics, how much and what history, what facts and ideals to insure economic justice, how much science, information relating to sex education and family life, and numerous other learnings and their bearing upon goals. As there is too much to be learned in the time available, it becomes obligatory to examine carefully and select wisely so that the most valuable objectives will be taught and emphasized. During this process of selecting, the needs of society, the needs of the individuals, and the capacities and natures of youth should be considered intelligently and scientifically. No more difficult work confronts the American people today because the solutions agreed upon foreshadow what the America of tomorrow will be.

Criticism of secondary education.—Many of the criticisms directed against high schools have been focused upon the curriculum. Fault is found with the imposition of college-preparatory subjects upon all pupils regardless of the needs and destinations of the majority of the school population. It is pointed out that from 80 to 85 per cent of high-school pupils do not go to college anyway, yet the curriculum is geared to the small minority. Traditional subjects are offered, and even required by everyone, even though the content is useless and obsolete. Even the content

of favorite subjects—subjects that should be valuable—does not function in life.

If one examines current newspapers and magazines, he will find criticisms of secondary education similar to the expressions that follow:

High schools are almost a complete and total failure; programs are not organized around life-processes of pupils; education as it now operates pays almost no attention to the individual.

It is essential that a course of study be developed that will reach the intellectually gifted, on the one hand, and the mechanical-minded, on the other.

A narrow and academic education—far from helping all youth form desirable patterns of behavior—often causes them to develop social maladjustments, thwarts normal learning impulses, and creates habits of failure which have wide and lasting implications both for youth and society.

All too often the high-school education is unrealistic, fragmentary, and does not serve the needs of young men and women. Plainly some action is needed to make the high schools appeal to all pupils, not merely a few.

Pupils drop out in large part because they feel that high school is "just a waste of time." They are not stimulated by their studies, nor do they see how the courses that they are taking will do them much good after they leave the classrooms.

This may be heresy, but I would not have vocational education at all in the high school.

Our high schools are not training people to be thinkers and leaders. Today few pupils are required to take Latin and mathematics, and these subjects do train individuals to think and solve problems.

Pupils leaving our high schools today cannot spell, work simple arithmetic problems, or write with any degree of accuracy and fluency. The high rate of juvenile delinquency shows the ineffectiveness of citizenship training. Training is spread so thin over everything that nothing is covered properly.

It is time the secondary schools woke up to the facts. At least 80 per cent of the student body never expects to see the inside of a college classroom. High-school pupils want to be prepared for citizenship, for making a living and getting along with their neighbors. And that is the kind of training they should get.

These criticisms reveal discontent with many phases of the high-school program. They also show that there are different viewpoints concerning what is the right kind of education for our adolescent youth. Best solutions for these problems will

demand time and effort from many individuals, especially from teachers.

Faith should not be shaken by the preceding criticisms, for high-school days can be made profitable to every pupil who is brought into contact with great personalities, worth-while content, and good teaching.

Weaknesses in the area of objectives.—Earlier in this book it was stated that the changes that are brought about through teaching center in the classroom—that here the aims must eventually be impressed upon living tissue. First, however, the aims must be firmly in the mind of the teacher before they can be brought out through teaching. Tyler points out four common weaknesses with regard to the objectives of high-school teaching:

> The first is the common failure to set up objectives. Many teachers carry on their daily activities without having any idea of the changes which they seek to bring about in the behavior of their students. Teaching, to them, is defined in terms of content to be covered or devices to be used, rather than in terms of ends to be reached. . . . To teach without objectives is to work blindly.
>
> A second weakness is more common than the first. It is the failure of many teachers to define their objectives clearly. . . . If an objective is clearly understood, the teacher should be able to describe the kind of behavior which it is expected the student will acquire. This kind of clarity is essential if the teacher is really to be guided by the goals that are sought.
>
> A third weakness with regard to objectives is commonly found in American high schools. It is the concentration on a very few objectives which are really the less important or the less desirable ones. . . . It is a sad commentary on much high-school teaching that, when objectives are clearly defined and used in instruction, the objectives sought are often of minor importance or even of the wrong type.
>
> Finally, with regard to objectives, a fairly prevalent weakness is somewhat the opposite of the preceding one. That is the practice of setting up more objectives than can actually be attained. To make really important changes in behavior requires time and many learning experiences. The school cannot possibly attain all the objectives which might be desirable. It is necessary to choose a few important aims and to work toward them consistently if they are actually to be achieved.[6]

[6] Ralph W. Tyler, "How Can We Improve High-School Teaching?" *School Review*, LVI (September, 1948), 388–89.

Steps in the selection of objectives.—It would be more beneficial for pupils if teachers devoted less of their time to routine matters and spent more of it on phases of primary importance. One of the phases of teaching with potential is preliminary reflection. Reflection about objectives is time well spent. With this thought in mind, the author has planned a journey for you in the realm of reflection. If you will at this time and any other time in the future do the thinking that is called for as you take this journey, the end results are bound to be profitable for the pupils taught. The journey is a series of steps that a teacher should take in the search for and the selection of objectives. You will notice that the road you travel is not a one-way affair; your steps can be reversed with considerable profit, but the author is particularly interested in having you travel one way on your first attempt.

1. Visualize what will be required of youth as they move into and live through the life that lies ahead. If we say that schools should prepare for present and future life, then education should equip one to do what he will be called upon to do. One needs to know the society into which the pupils will enter before he can prepare others to assume the responsibilities demanded by that society.

2. Classify the major needs and responsibilities of youth as these young people come to grips with living in our democratic society. Others have already worked on this breakdown of life into areas or needs. Examine the seven cardinal objectives of secondary education by the Commission on the Reorganization of Secondary Education and the ten imperative needs of youth of secondary-school age by the National Association of Secondary-School Principals as quoted earlier in this chapter. Such a breakdown should help one to see more clearly the large areas of activities that comprise living in our society.

3. Determine in a general way what your subject or whatever you teach should contribute to the education of pupils. As schools are now organized, a number of teachers will be employed to carry out the educational program of any particular school. Each teacher will be responsible for a part of the work, but the combined efforts of the faculty should eventually result in well-rounded training of all pupils. It is recognized that the study of English should produce changes somewhat different from the changes brought about by the study of social studies or general science or industrial arts. Each subject has its own major values in relation to the big areas or needs of life. It is the duty of each teacher to know the significant contributions his subject can make in meeting the needs of youth. One should think about aims,

read committee reports, examine bulletins and magazines, and observe and study the problems and situations facing youth and adults.

4. Determine what your specific objectives should be. While the contributions of a subject have been considered in a general way in the preceding step, the time comes when more refined objectives must be worked out. A specific aim plays a part in the realization of a more involved aim or ultimate objective. You are now back in step 2. An ultimate objective is: All youth need to develop and maintain good health and physical fitness. What conditions in society make it difficult to develop and maintain good health? In three and one-half years of war, from Pearl Harbor to V-J Day, 300,000 fighting men of our armed forces were killed or missing. Such results are expected in war, but brace yourself for this fact. In the same period of time with automobile travel reduced to a minimum, 355,000 got themselves killed in the United States. Of these victims, one-third, or 118,000, were killed in their homes. Do these facts mean anything to teachers of health? Should these statistics enter into the selection of aims? They certainly should. Further analysis of the facts shows that falls cause a high percentage of deaths and serious injuries in homes. Still further analysis will reveal where the falls occur and why. Continuation of analysis shows at what ages the falls take place. At this stage a teacher of health should be able to select a specific aim that should be taught. Similar analysis can be undertaken by teachers of any subjects. This kind of searching should reveal what the needs of society in general and the individuals in particular really are.

5. Use criteria to help you in the narrowing search for specific objectives. Authorities in the field of curriculum construction often consider measures of validity called criteria. Frequency of occurrence is one criterion. This one has been used to find the words most often used in writing letters and compositions; these words then are the ones that a person should be able to spell. This criterion has also helped to determine the most frequently used fractions, punctuation marks, verbs, and other social usages. Another criterion is that one stressing production and consumption. Most of us are consumers, not producers. For everyone who writes a book review, there are thousands who read or consume book reviews; for everyone who composes music, there are thousands who enjoy music. The law of diminishing returns is one more criterion. Does it pay to reach a high degree of perfection in penmanship? It may be that the time consumed in perfecting one's penmanship beyond a certain point is a waste of time because perfection is not required or even necessary in the common affairs of men. Other criteria are related to transfer values, immediate and deferred values, preparatory values, adaptation to local needs, and critical nature of a concept. One may never need to swim, but the lack of this ability may be critical if one must swim to save his life or the life of a loved one. These criteria and others should play a part in the final selection of aims.

6. Make a thorough study of the pupils you teach. The findings in the preceding steps must now be focused upon a particular group in a class-

room. However, further analysis is necessary. The maturity of pupils will bear heavily upon the specific aims. An aim may be desirable in itself, but, if the maturity of pupils is not sufficient, the aim will not be attained. Unless the objective is actually attained, no learning has taken place, and the time spent is really wasted. The maturity level, therefore, is an important consideration in the selection and placement of content. Interest, also, must be generated or be present in the class, otherwise learning will be partial or probably nil. Then the particular community in which this class lives and from which it comes will make a difference. The homes, industries, nationalities, moral and spiritual conditions, educational backgrounds, and cultural advantages influence the learning of this group. All these circumstances and conditions should be kept in mind by the teacher while effort is devoted to the final determination of definite teaching objectives.

7. Finally, be aware of what attainment of aims really means. The best indication that an objective has been attained is that there is clear evidence of a change in behavior. A pupil can be induced or even forced to memorize that honesty is the best policy or that politeness is to do and say the kindest things in the kindest way, but mere repetition of these sayings is no evidence that the pupil is growing in honesty and politeness. The real test is whether he is becoming more able in his everyday dealings with others to be honest and polite. Full attainment is not reached until the aims function, are applied, find a use, and are lived out in appropriate action. Too often verbal display of knowledge or information is mistaken for attainment. With most objectives, however, learning does not stop with words—genuine attainment must be judged in terms of the degree to which a person is able to use and apply and live out what the words signify. The ability to use and apply in actual life-situations should be included in the teacher's concept of aims. To stop with mere verbal display means that the most important ingredient of an objective has been missed completely. The old proverb that actions speak louder than words applies equally well to aims.

This journey started with the world of human beings around you and ended in the selection of some outcome to be attained by pupils in a classroom. The reverse process, travel from the classroom out into society, is also necessary; the specific outcome must lead to a larger goal. In teaching there is this continuous flow of thought in both directions, from the general to the specific and from the specific to the general. At any rate, the specific aims finally selected should play a vital part in some growth or development required by pupils in their preparation to live and prosper in the society of which they are a

part. Be sincere and conscientious in your efforts to choose worthy objectives, and be sure you see where these objectives lead.

NATURE OF OBJECTIVES

Too often it is concluded that objectives are only those factual and informationl materials found in books, generally textbooks, materials which are memorized, recited in class, and kept in storage for final examinations. Because this belief is often held, an enlargement of the concept of most worth-while objectives is necessary. The testimony given by a high-school Senior serves well as an introduction to the following enlargement of the concept of objectives:

> Vividly do I recall many aims which my teachers had, aims which permitted the formation of wrong habits and led to inadequate learning. One instance is my inability to add numbers with any degree of efficiency. Many columns of addition problems were written on the blackboard, and we pupils copied them on our slates, added them, and then waited for class recitation. After we were seated on the recitation benches, we were called upon individually for answers. When Mary, Lewis, Rose, and Myrtle had given the wrong answer, I was called upon for the right answer. Out came the answer distinctly and correctly. Indeed, my answers were always right. I felt somewhat proud of my accomplishment, then. What made possible this superiority in addition? After each problem was copied on my slate, little marks were placed beside each of the digits, as many marks as there were units in the digits. When this was done, I employed the counting-of-marks technique to find the sum. After the answer was written down, the marks were erased, and then the same procedure was used for the other columns. In class I shone, but behind this apparent accomplishment a weakness was fostered which left its dark shadow throughout my life. The combinations were never learned, the counting habit persists, accuracy is always doubtful, and speed is snail-like. My teachers were looking for products, and they got exactly what they wanted. What a blessing it would have been for me if they had considered and worked for processes, too. Because they missed or neglected certain essentials, I grew up lamentably weak in ability to add rapidly and accurately.

The first point under the "Nature of Objectives" is to realize that processes are quite as important as products—sometimes immeasurably more valuable. The cloak of product hides many a skeleton beneath. In your own lives, which do you value more highly: your ability to get the right answer in addition or the efficient process which enables you to get that answer quickly

and accurately; the ability to recite a poem or the process underlying the rapid learning and good retention of anything you might memorize; the knack of saying "rise, rose, risen; go, went, gone," etc., or the ability to use the correct forms accurately and speedily in your writing and speaking; the giving of the content of some paragraph or topic you studied over and over or the ability to read rapidly and retain the content of whatever you read; the ability to remember after you are shown how or the power to think through and solve the problem yourself? Surely, the latter halves of these alternatives, the *processes* in learning, should not be overlooked; they are too valuable in facilitating the acquisition of the end products.

A development of the following interwoven and interlocking aims will help you to see more of their real nature: (1) processes versus products, (2) understandings versus recitation of symbols of learning, (3) true appreciations versus forced conformity, (4) inner transformation versus memorized rules of the right, and (5) development of attributes versus subject aims alone.

1. *Processes versus products.*—The illustration of addition suffices to bring out the importance of both products and processes. Too often, however, the processes are neglected, and the products alone are emphasized. A teacher must watch the development of processes because they underlie and support the growth and attainment of products. The right answers given in class may be the work of father, mother, brother, or sister. Acceptance of these right answers (products) as the only aims to be recognized leaves the pupils innocently unaware of the value of the processes. Teachers must be everlastingly on detective duty to find the processes behind the products. Reading habits, spelling techniques, outlining, memorizing, reasoning, organizing, reviewing, and other processes condition the attainment of products. The fostering and supervising of these valuable activities or processes, in the learning of pupils, are extremely important. Both the processes and the products are parts of a whole, and both can be and should be developed simultaneously.

2. *Understanding versus recitation of symbols of learning.*—Much of school learning may be characterized as the recitation

of symbols of learning, meaning that both teachers and pupils are satisfied with the mere recitation of meaningless memorized symbols. Whenever these symbols pass for true learning, the fault lies with teachers. Pupils do what is set for them to do; they follow the directors of learning. Pupils memorize theorems, rules, formulas, steps, provisions, etc., with never an inkling into their derivation or meaning or application. Of course, many of these must be taken at face value, but to subject pupils to a constant flood of materials to be memorized without understanding them is an unjust and inefficient procedure. Understanding is the first and foremost prop in retention. Understanding is an objective, important and profitable, and to neglect it is a serious mistake. What does it profit a pupil if he is compelled to cram his mind with meaningless words and symbols? These fade away, but understanding remains.

Recently the writer observed a class in geometry in which possible, reasonable, and profitable comprehension was sacrificed for memorization of symbols. Pupils were learning how to inscribe a circle in a triangle and to circumscribe a circle about a triangle. To make certain that pupils would bisect the angles of the triangle when inscribing a circle in a triangle and that they would construct perpendicular bisectors of the sides in circumscribing a circle about a triangle, the following mnemonic device was formulated, and two rules were memorized:

$$\begin{cases}\text{inscribe}\\ \text{angles}\end{cases} \qquad \begin{cases}\text{circumscribe}\\ \text{sides}\end{cases}$$

RULES: To inscribe a circle in a triangle, keep the two vowels together. To circumscribe a circle about a triangle, keep the two consonants together.

Could not pupils discover for themselves that, if a circle is to be inscribed in a triangle, the sides of the triangle must be equidistant from the center of the circle. Surely, bisectors of the angles of a triangle meet at a point equidistant from its sides. Perpendicular bisectors of the sides, however, do not necessarily meet at such a point, as shown in Figure 1. Again, if a circle is to be circumscribed about a triangle, the three vertices of the triangle must be equidistant from the center of the circle. Bisectors

of the angles will not necessarily meet at a point equidistant from the three vertices, as is shown in Figure 2. Pupils should not be required to memorize devices and rules when the exercise of a little gray matter will give lifelong understanding and appreciation.

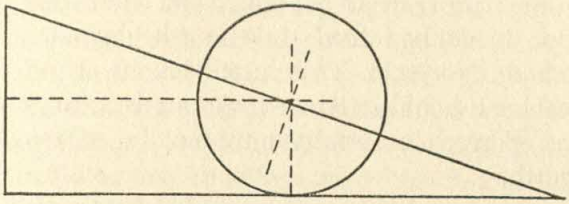


FIG. 1

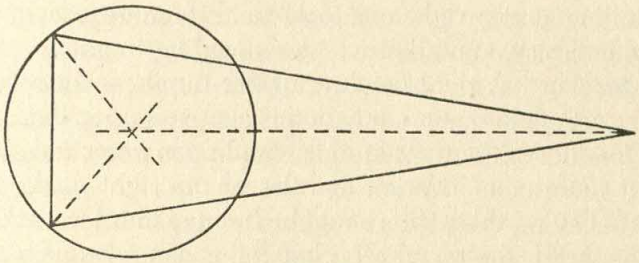


FIG. 2

3. *True appreciation versus forced conformity.*—Many objectives should take the name of "appreciations." It is quite unlikely that two persons have the same appreciations or the same quality and quantity of any one appreciation, and to try to force adult appreciation upon young pupils seldom meets with success. Teachers can expose pupils to appreciations, but pupils must decide for themselves which ones they will accept as their real and true ones. No amount of force can make one love a person. Love comes from within; it cannot be forced in. There is the story of the boy who learned to hate the American flag because he was forced by an outside authority to give the flag salute fifty times after school every day for a week; this was forced conformity. There is no end to the list of forced conformities which are mistaken for appreciations, but they are not true ones. Literature, history, hygiene, and other school subjects

abound with forced conformities. This poem must be learned by heart because it is a gem (in the eyes of adults). This man is the true patriot (because we adults selected his virtues as ideal). Would it not be better to have pupils study poetry and history and have them exercise their own power of evaluation so that genuine appreciations could be formed and cherished? Love and appreciation cannot be forced; they must be developed by exercise of something within. True appreciations are vital attainments. Teachers should strive to have pupils form genuine appreciations. Forced conformity must not be mistaken for esteemed worth.

4. *Inner transformation versus memorized rules of the right.*—Very closely related to true appreciation are those transformations falling under right conduct. In this group are honesty, loyalty, courtesy, and all other ideals leading to good conduct. Every teacher has right conduct of her pupils as an aim. The greater part of character education is centered upon better conduct. Conduct of the right kind is based upon inner transformations; if mere memorization of rules of the right could insure proper behavior, this nation could be freed of murder, racketeering, vice, graft, theft, and all other forms of wickedness in one decade. It is not easy to secure inner transformations, but inner transformations should be seriously sought for in every classroom. There must be this inner worth or feeling of value. Memorized principles of conduct are not deep-rooted; they are generally characterized by lip service. Soul and heart determination alone make for permanent and steadfast right doing. One should always bear in mind that learning must be real. Learning cannot be artificial; it must be genuine.

5. *Development of attributes versus subject aims alone.*—Side by side with pure subject aims must come the development of personal attributes. Aims cannot be limited to pure skills, fixed mental associations, and information. Will a father be as much concerned about his son's ability to view both sides of an issue impartially, critically, and scientifically, as he will about his son's ability to recite the preamble of the Constitution or to enumerate a dozen powers of Congress? Will a mother be concerned only

with her daughter's skill in typing, or will she also be interested in her manners, neatness, industry, and punctuality? What will life in a busy world demand? Failures are more often due to lack of personal development than to lack of informational or academic acquirements; the man with ideals of punctuality, perseverance, thoroughness, accuracy, neatness, obedience, tolerance, broadmindedness, and regularity, wins his battles, his successes, his promotions, and his rewards in life's journey infinitely more often than does the one-sided, academic, encyclopedic being. Objectives should be set forth in completeness; the demands of living and enjoying and succeeding determine the nature of what should be taught; pupils must know, must be, must feel, and must do; mere knowing is not enough. Yet how many teachers stop short of completeness, quite often oblivious of the real and vital elements of complete pupil development. Real objectives must first be in a teacher's mind; when they are there, some possibility for a pupil's development is near; when not there, no amount of pedagogy can compensate for the deficiency.

APPLICATION EXERCISES

1. A prominent educator wants to know what good the study of algebra or Latin does pupils. Could you justify these subjects for study by all pupils? By some pupils? A lecturer is opposed to the study of beauty culture and auto-driving as school offerings. What arguments could you present in favor of these subjects?
2. If you wrote a magazine article about secondary schools, what improvements would you recommend?
3. Take some academic subject, such as mathematics, science, or history, and show how a conscientious teacher could set up objectives other than facts and information.
4. Often the requirement in English is the memorization of two hundred lines of poetry during the year. Do you see any value in this requirement?
5. Are you able to distinguish between products and processes as aims? Can you think of some processes that you failed to learn that you should have learned during high-school days?
6. Tyler states that teachers often concentrate on some objectives which are of less importance or are the less desirable ones. Can you explain what he means by using illustrations from your high-school experiences?
7. It is true that learning should produce a change in behavior. Select several objectives that you think are important and then describe

the kinds of behavior which would indicate that the objectives had actually been attained.

8. In a certain high school in which there were one hundred and forty pupils in the Freshman class, a teacher of physiology had a class of twenty of the dullest. On Monday she gave this question: "What happens to the food from the time it enters the mouth until it is absorbed and assimilated by the cells of the body?" The twenty dull ones read their textbooks during the Monday period. On Tuesday she had them write what they had learned on Monday. On Wednesday she scolded them for their poor results of Tuesday and then told them to get busy and study for the rest of the period so that they would have something "in their heads" to write about on Thursday. Make a list of objectives you think would be more appropriate for these dull pupils, that is, if you do not believe the teacher had the right aims.

RELATED READINGS

ALEXANDER, W. M., and SAYLOR, J. G. *Secondary Education: Basic Principles and Practices,* chap. iv. New York: Rinehart & Co., 1950.

AMERICAN YOUTH COMMISSION. *What the High Schools Ought To Teach.* Washington, D.C.: American Council on Education, 1940.

ANDERSON, V. E.; GRIM, P. R.; and GRUHN, W. T. *Principles and Practices of Secondary Education,* chaps. ii–iii. New York: Ronald Press Co., 1951.

BRIGGS, T. H., and JUSTMAN, JOSEPH, *Improving Instruction through Supervision,* chap. xi. New York: Macmillan Co., 1952.

CASWELL, H. L., *et al. The American High School: Its Responsibility and Opportunity.* New York: Harper & Bros., 1946.

DOUGLASS, H. R., *et al. The High School Curriculum.* New York: Ronald Press Co., 1947.

NATIONAL EDUCATION ASSOCIATION. *The Purposes of Education in American Democracy.* Washington, D.C.: Educational Policies Commission, 1938.

——. *Education for All American Youth: A Further Look.* Washington, D.C.: Educational Policies Commission, 1952.

Report of the Harvard Committee: General Education in a Free Society, chap. iv. Cambridge: Harvard University Press, 1945.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chaps. i–ii. New York: Appleton-Century-Crofts, Inc., 1948.

WRINKLE, W. L., and GILCHRIST, R. S. *Secondary Education for American Democracy,* Part III. New York: Farrar & Rinehart, Inc., 1942.

CHAPTER IV

PRINCIPLE 2: PUPILS LEARN THROUGH SELF-ACTIVITY, BUT THIS ACTIVITY SHOULD BE PSYCHOLOGICALLY SOUND

THE first principle is related to the selection of objectives. No teacher can overlook this principle or see it indistinctly without impairing enormously the educational progress of those who come under her influence. Objectives will ever remain the pivots in teaching, and the selection of the most important aims will always be a responsibility of any conscientious guide of another's education.

After the selection of objectives there arises the problem of directing the learning activities. Indeed, no task confronting teachers is more perplexing or more involved than the one of understanding the mental and physical processes which should be brought into play and kept in play by pupils so that the most effective learning results. The *what* of teaching (the objectives) and the *how* (directing learning) must be kept abreast of each other; to dwell upon one while totally neglecting the other results in a lack of perspective and a failure to meet adequately the actual learning situations found in high schools. One cannot study surgery in the abstract; he must study it in connection with the object upon which the surgery is to be practiced; so in the discussion of learning one must study learning in connection with what is to be learned and the individuals doing the learning. While the problem now is to see the importance of processes in learning, there will always be some connection with the materials upon which these processes are exercised. What must a teacher know about learning in order to do efficient teaching? To find the best answer to this question is, from this point on, a major concern and duty. The proper procedure is to view learning in the large before going into details, hence this chapter is devoted to the basic principle which supports all learning. Attention must now be focused upon this basic principle which is to

support all knowledge of mental processes that may enter into the superstructure of teaching, no matter how high it may be built.

PUPILS LEARN THROUGH SELF-ACTIVITY

Everything that enters into pupils' education enters in but one way: through the activity of the pupils. Whatever forms the educational aims may take, these aims are attained only by exertion and application; they cannot be bought; they cannot be inherited; they cannot be given to pupils; they can be possessed only through self-exertion. The fruits of learning, unlike so many other things in life, are not subject to graft, barter, wealth, social standing, or political influence. Regardless of favorable or unfavorable circumstances, learning holds as true to this law of self-activity as do objects on the earth's surface hold true to the law of gravity. Everything about learning is not known, but the law that pupils learn by self-activity will be everlasting.

Three learning exercises.—Perhaps the best way to proceed in order to instil an idea in a teacher's mind is to have the teacher experience the idea in her own learning. There is an old saying which expresses this idea: "He who would bring tears to your eyes must first experience sorrow"; likewise, he who would teach others must first experience true learning.

1. At the end of this chapter (Exercise No. 1) is a figure intended to give you a personal experience with learning. While acquiring the ability, analyze your learning from the self-activity angle.

Expose the figure to yourself for ten seconds, and then reproduce as much of it as you can on a piece of paper. Put your first trial paper from sight. Expose the figure again to yourself for ten seconds, then reproduce as much as you can, and put this second trial paper away. Continue the trials until you are certain your last trial is perfect.

Retrace your steps now, as you view the trial papers arranged in order before you. Did you do well on the first trial? What errors did you make? Were you angry or ashamed of yourself? Did the previous estimate of your intelligence drop a few points? Enumerate all the activities you performed before you were able to reproduce the figure correctly. Among these activities will be looking, drawing, contrasting, comparing, correcting, and talking

(to yourself). Examine your learning and secure many more activities. All of them make up the general term "self-activity." In short, you learned to construct this figure, and you thereby experienced the general law. You are now in a better position to understand the principle in your teaching because you have experienced it in your own learning.

2. Another personal application of the principle should be attempted because it involves a few additional mental activities of a more profound character.

Exercise No. 2 at the end of this chapter contains four polygons. The aim in this case is to have you discover by your own effort, not memorize, how to find the sum of the degrees in the interior angles of any polygon. (A polygon is an area bounded by three or more straight lines.) The interior angles are numbered in each polygon. The sum of degrees is found, as, for example, in polygon *a*, by adding: angle 1 + angle 2 + angle 3 = the sum of degrees in the interior angles of the polygon. The other polygons are treated in the same manner, but there are more angles to consider. Polygon *a* is half a square. A right angle contains 90 degrees. Do Exercise No. 2 now, but be sure to do the exercise without assistance from anyone until your own capacity has been fully taxed. The sum of the degrees is to be expressed by a number.

While doing Exercise No. 2, a few more activities must surely have been brought into operation. Probably among these were: recalling facts learned previously, making application of these facts, discovering mistakes in applying recalled facts, recalling more facts, making new applications, reasoning, associating, and making generalizations.

3. One more exercise will be given.

The aim is to have you acquire the ability to change Fahrenheit degrees to centigrade degrees, and vice versa, without the use of formulas, but through application of common sense. Exercise No. 3 gives the needed information. Turn to it now and exercise to the full the law of self-activity. (NOTE.—A man's height remains the same whether that height is expressed in inches, feet, centimeters, or decimeters.)

If you have done the mental and physical work called for in these three exercises, you have employed the principle of self-activity in learning. If you have not mastered the exercises, and if you wish or hope or intend to do so, there is just one road to salvation, and that road is marked "self-activity."

Forms of self-activity.—While the central idea of self-activity in learning has by this time been experienced, a keen mind

naturally turns toward a finer analysis of the term. In solving the exercises, a number of mental (and probably physical) processes were in operation, but all these were parts of the complete and general operation—self-activity. Self-activity is composed of many specific operations. A pupil generally employs not only one operation; he employs a number of operations. His total operations are grouped under the one term "self-activity." The task now is to feel and appreciate and understand the meaning of self-activity as it operates in hundreds of learning situations. As Gates says: "Of prime importance is the first generalization, namely, that we learn by reacting. Learning takes place only during activity; it is never a passive process of absorption, but on the contrary, a very active process of reacting."[1]

What different forms do these reactions take? The forms of reaction or self-activity are numerous. These forms of efforts range from making simple drawings on a paper to the most difficult efforts put forth in abstract reasoning. At one time a pupil looks, at another time he listens; he makes a drawing, he shuts his eyes and visualizes, he recalls something, he goes to the dictionary and looks up a word, he memorizes the meaning, he uses the word in his discourse, he makes a guess, he tries out the guess, he finds his guess is wrong, he sets his mind to try again, he looks for another reason, and he performs hundreds of operations. Whether or not the pupil is using the right operations while he exercises self-activity is beside the point now; here emphasis is placed upon the truth that pupils must do something to learn.

The rewards of self-activity.—No other principle in directing the learning of pupils is more often violated than this one of self-activity. Teachers often fail to realize that pupils must pay the price for every ability acquired; and, as a result, teaching frequently becomes the process of lifting, carrying, dragging, pulling, shoving, and otherwise assisting pupils along to the end of the course, subject, or term. Teachers do the reading, the explaining, the thinking, the talking, the appreciating, the devising, the planning; the problems are teacher-worked, the reasons are teacher-thought-out, the formulas are teacher-derived, the apparatus is teacher-set-up, the causes are teacher-enumerated, the

[1] A. I. Gates, *Psychology for Students of Education* (New York: Macmillan Co., 1930), p. 254. By permission of the Macmillan Company, publishers.

beautiful is teacher-selected, the wicked is teacher-condemned, the right is teacher-praised; all that pupils do is to remain passive, to listen, to copy, to memorize, and finally to recite or to write at a stated time what they can squeeze out of crammed minds. The bulwark of this concept of education is the easy eating of teacher-provided and -prepared and -digested food. In their chairs beside the table sit these teacher-spoon-fed pupils. Years go by, but these spoon-fed babies remain the same; they remain babies because they are fed as babies. Will they ever be anything else? Yes, they may grow bigger, but they will always be babies, either big or small. At the table they will sit, calling for soft foods, the provided foods, the predigested foods.

The concept of education supported by self-activity implies that pupils must earn their own living, that they must develop muscle and bone and mind, that they must work to become strong, that they must think to be thinkers, that they must plan to be planners, that they must reason out causes to understand relations—in short, that what they will become is determined by what they labor to be. No learning of importance ever comes without important activity on the part of the learner. Every important ability demands its proportionate amount of self-activity. Without the price in terms of self-activity, valuable abilities cannot become one's possessions.

The foregoing emphasis upon self-activity in learning does not imply that teachers should recede and withdraw from the picture, but it does imply that this fundamental principle of learning should be given an opportunity to be exercised to the maximum degree by those taught. Efficient teaching is based upon the knowledge of how learning takes place. He who understands how learning takes place can become an efficient guide to learning. Teaching is the directing of another's learning, and the principle of teaching which gives that learning general direction is: *Pupils learn through self-activity.*

SELF-ACTIVITY SHOULD BE PSYCHOLOGICALLY SOUND

The word "general" in the immediately preceding paragraph signifies that the teacher gives general direction to learning by

keeping the principle of self-activity as the guide. Now, self-activity in itself must be guided so that it is efficient activity. In short, mere expenditure of energy is not enough; that energy should be spent in psychologically sound activity. A pupil may spend an enormous amount of time and energy using the hunt-and-peck method of typing and still never reach a high level of performance. Of course, this example is commonplace, yet it does make one realize that much self-activity is likely to be wasteful and ineffective.

Before a director of learning can proceed in her selection of psychologically sound activity, she must know the ends which are to be reached. The activity cannot be considered abstractly or separately in determining its soundness; it must always be considered in connection with aims. Teaching goes astray as often in lack of selection of worthy aims as it does in failure to select the right kind of activity. Greater by far are the possibilities of the right selection of mental processes if the aims are fully comprehended. At any rate, an awareness of the exact nature of the objectives is the initial step in the subsequent selection of sound and efficient activity.

Sound self-activity illustrated.—Two classroom situations will help you to experience in your own learning the relationship existing between objectives and the soundness of activity.

Situation 1.—Objective: To teach pupils to be able to get answers to percentage problems in which the known part is less or more than 100 per cent of the desired part. For example: If 130 per cent of a number is 195, what is the number? Teacher's direction of pupils' mental activity: "Reduce per cent to a fraction and proceed as follows:

130 per cent = $\frac{13}{10}$
$\frac{13}{10}$ of a number = 195
$\frac{1}{10}$ of the number is $\frac{1}{13}$ of 195 = 15
$\frac{10}{10}$ of the number = 10 × 15 = 150

Copy this in your notebooks and memorize it. Work the twenty problems on pages 75 and 76. Tomorrow there will be a test on these problems, and, if you follow the steps I gave you, all of you should get 100."

Situation 2.—Objective: To direct the learning of pupils so

that they will reason out and understand for all time how to solve percentage problems in which the known part is less or more than 100 per cent of the desired part. For example: If 130 per cent of a number is 195, what is the number? Teacher's directions of pupils' mental activity: Questions: "Will the number we are looking for be more or less than 195? What makes you think so? Will the number we are looking for be nearer 195 than it is to 1? What makes you think so? Instead of saying 130 per cent of a number, what else could we say? (Answer, 13/10.) How many tenths are there in the number we want? (Answer, 10/10.) If we could find out how much 1/10 of the number is, could we find out from that the whole number? How? Well, how many tenths of

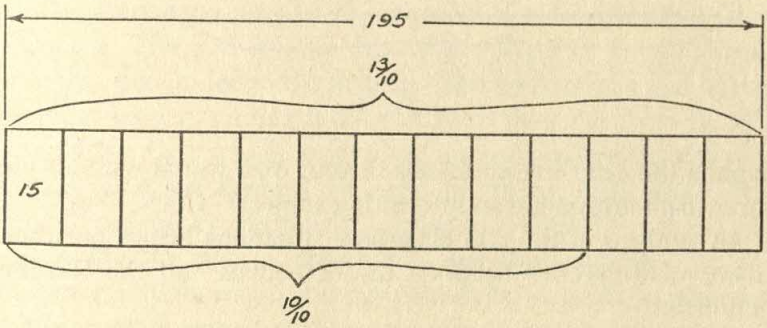


FIG. 3

the number do we have given in the problem? (Answer, 13/10.) Now, each one of you get pencil and paper; on the paper draw a figure like this one (teacher draws figure on board [Fig. 3]) which is to represent the 13 tenths. Can you divide your figure to show the 13 tenths? How many tenths are there in the number we want? (Answer, 10/10.) Yes, but we have 13/10 of the number we want. How can we find 1/10?" Pupils discover that by dividing 195 by 13, the size of one block can be found, and 10 times one block (15) gives 150, the required number. "Graph your thinking. Would you like to figure out another problem all alone?" Class, "Yes." Problem: By selling a suit of clothes for $40, a dry-goods dealer lost 20 per cent of what he paid for the suit. What did the suit cost the dealer? "Remember, graph your thinking. Do not let the problem deceive you; you conquer the

problem. Read it carefully and do not go astray. Talk to yourself about the problem. Be the dealer yourself." Pupils have difficulties, but everyone of them finally conquers the problem individually (Fig. 4). "Tomorrow the work will deal with problems of this kind. Bring in pictures of the first three. Do the last three without making pictures, merely mental pictures. Be able to

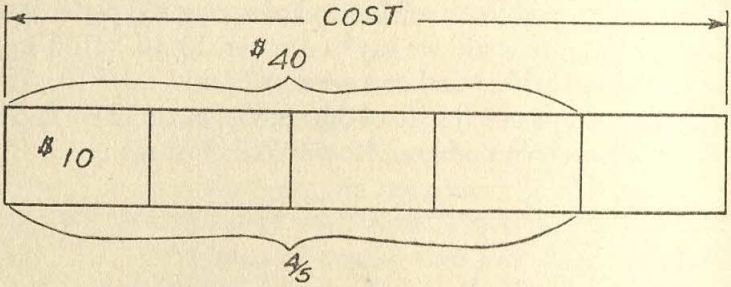


FIG. 4

explain the last three problems in your own words without pictures. Isn't arithmetic an interesting subject?" Class, "Yes."

An analysis of the two classroom situations brings out these points of difference between the objectives and the learning activities:

SITUATION 1

Objectives:

1. Skill in getting answers
2. Temporary results sufficient

Activity:

1. Memorization of a set procedure
2. Repetition of this procedure

SITUATION 2

Objectives:

1. Ability to solve problems
2. Understanding of the process by reasoning and seeing relationships
3. Permanent ability to solve problems of this kind by thinking through the situation

Activity:

1. Studying the nature of problem
2. Review of past knowledge
3. Graphing the situation
4. Reasoning out the steps individually
5. Application in a new situation
6. Careful thinking in all situations
7. Gradual transition in thinking from the concrete to the abstract

Objectives and activity inseparable.—Much teaching is poor because it lacks real objectives; much teaching is poor because it lacks sound learning activities; all teaching is poor which lacks both of these; good teaching never lacks either of them. In Situation 1 the teacher was looking for skill in getting answers, and the pupil activity she demanded was memorization of a set procedure with plenty of repetition to drive the procedure to a high-degree of execution. The activity was sound in the light of the aim. In Situation 2 the teacher had different aims; she was working for an understanding of how to work such problems—an understanding of why they were worked this way, the ability to solve such problems by reasoning, the ability to solve them ten or twenty years from now by the exercise of careful thinking and reasoning. The activity she demanded of pupils was different from that demanded in the first situation because she had different aims. Understanding is derived through mental activity different from that which is involved in pure memorization; the former must be derived through reasoning, and the latter through constant repetition of a procedure quite often meaningless. Ability to meet a situation at any time because one has mastered it by thorough and individual thinking differs from the ability to get answers now through mere memorization of a temporary get-correct-anwers formula for an impending examination. If teachers had objectives of most worth always in mind, then the soundness of the activity could be treated alone. This emphasis upon objectives is intended to warn against the practice of determining the soundness of an activity dissociated from the ends of learning. Even with aims of highest value in mind, teachers may still direct learning ineffectively, but the chances for poor directing are immeasurably reduced.

Burton realized fully the part that psychologically sound activity plays in learning when he wrote about memorizing, as follows:

> There has been much confusion and malpractice by older pedagogues in utilizing memory in learning. Obviously, arbitrary associations must be memorized by rote, acquired through continuous repetition. Forcing the

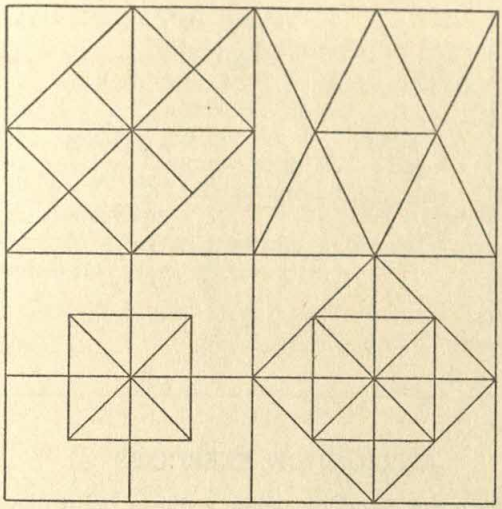
pupil to learn by rote was the path of least resistance, and the method came to be applied to material which cried out for other treatment. Rote memory is necessary when material demands it, but cruelly wasteful and educationally detrimental when used upon material that is logical. Associations of the latter sort can be made into a system of thought and attached to already existing systems. A study of the thought content of the material should precede the actual memorization. This enables the learner to understand the sequence of ideas, and associate it with other ideas, thus setting up many aids to speedy memorization and ready recall. Material to be memorized may thus be studied by the problem-solving or appreciation techniques in advance of committing to memory.[2]

When materials cry out for a different treatment, they are being subjected to the pains of unsound mental operations that function drearily and ineffectively in the learning of certain materials. A lack of real aims and, naturally, a lack of sound psychological activity are both playing havoc in the situation described by Burton.

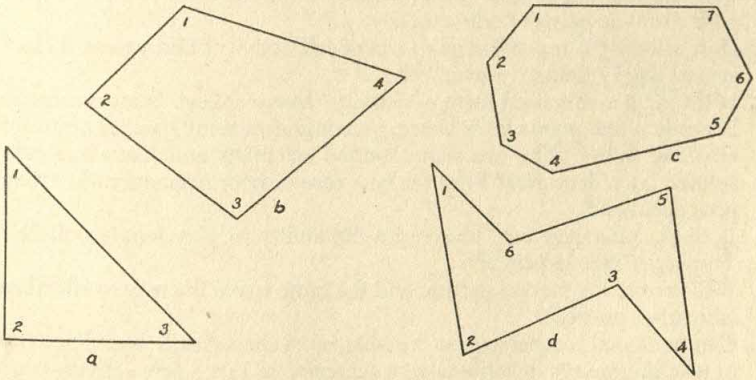
Failure to understand the sound mental processes which underlie the acquisition of content will mean failure in meeting an important obligation of teaching. What are the psychologically sound activities supporting the attainment of objectives? The next principle of teaching leads into an analysis of learning, and from this analysis should come an increased ability on the part of the teacher to see which learning activities will probably be most effective in guiding pupils while they work to gain designated ends.

[2] W. H. Burton, *The Nature and Direction of Learning* (New York: Appleton-Century Co., 1929), p. 195.

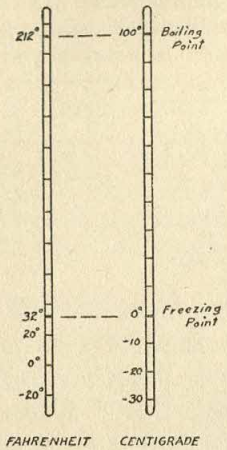
EXERCISE NO. 1



EXERCISE NO. 2



EXERCISE NO. 3



1 Change 20° Centigrade to Fahrenheit

2 Change 158° Fahrenheit to Centigrade

3 Change -15° Centigrade to Fahrenheit

4 Change -13° Fahrenheit to Centigrade

ANSWERS

1 68° F

2 70° C

3 5° F

4 -25° C

APPLICATION EXERCISES

1. Do you believe that speaking before a mirror helps one to speak in public? Why?
2. Pupils are sometimes required to outline the chapters in their textbooks. Is this practice a sound one?
3. Enumerate a dozen ways a teacher might violate the principle of self-activity.
4. Can you think of several good reasons why home work is looked upon with disfavor by some educators?
5. How effective is repetition as a form of self-activity? Did you ever learn something by doing it just once?
6. Is listening a strenuous form of activity? Many college Seniors remember only a few points after hearing a commencement speaker orate for an hour. Why? Why are some learned scientists and historians considered "dry" lecturers? Might it be a case of poor listeners rather than poor speakers?
7. Is there some easy way to acquire the ability to play tennis skilfully? To play bridge expertly?
8. Will the talking motion picture and the radio make the way to effortless education possible?
9. Can two good teachers agree on what is psychologically sound activity in teaching pupils to know what a sentence is? List a few activities you consider sound and compare your list with lists made by your classmates.

10. This problem is very confusing to students: A duck weighs three-fourths of its own weight and three pounds more; how much does the duck weigh? The author has found many students who say that it is absurd and impossible. Can it be solved? Even if it is impossible, what activities did you use in attempting to solve it?

RELATED READINGS

PRESSEY, S. L., and ROBINSON, F. P. *Psychology and the New Education*, pp. 444–48. Rev. ed. New York: Harper & Bros., 1944.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools*, pp. 68–73. New York: Appleton-Century-Crofts, Inc., 1948.

RUEDIGER, W. C. *Teaching Procedures*, chap. xviii. Boston: Houghton Mifflin Co., 1932.

WITHERINGTON, H. C. *The Principles of Teaching*, pp. 138–44. New York: Prentice-Hall, Inc., 1939.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension Services
CALCUTTA-27

CHAPTER V

PRINCIPLE 3: SELF-ACTIVITY TO BE PSYCHOLOGICALLY SOUND SHOULD BE IN FULLEST AGREEMENT WITH THE TYPE OR TYPES OF LEARNING INVOLVED IN ATTAINING THE OBJECTIVES

THAT self-activity should be psychologically sound is a fundamental principle which should guide the selection of learning activities. This general principle must now be built up step by step in order to determine activities in learning which are psychologically sound. Football players know that the ball must move in a general direction for a touchdown, but they must know also the many activities in playing which make possible the progress of the ball toward the goal; just any activity will not do. Physicians know in general that sick patients must regain good health, but physicians should know the specific requirements of good health. Teachers may know in general that pupils learn by reacting, but they should also know the sound activities which constitute the general reaction. In every one of these instances the problem is one of finding the expedient means to fulfil a guiding principle.

Self-analysis.—At this point the prospective or experienced teacher will find it profitable to begin a personal analysis of the learning involved in attaining objectives. Objectives can always be expressed as abilities—abilities to do, to be, to say, to know, to feel, to make, to understand, etc. Examine your learning thus far in life and list ten abilities that you treasure highly. Consider your ability to sing, to play a musical instrument, to paint a good picture, to use good English, to speak a foreign language, to dance, to make a good cake, to appreciate good music, to know the elements in chemistry, to recite and appreciate "The Man with the Hoe," to coach football, to make a motor run smoothly, to solve quadratic equations, to find the volume of a cylinder, to explain the causes of depressions, to keep your temper in an argument, to be honest, to be neat, or to put aside your prejudices in weighing the soundness of a new proposal. These abilities are

suggestive of ones you might select, not necessarily the ones you will select. At any rate, select ten abilities you consider important, then analyze carefully the learning activities you brought into operation while developing each one of the abilities. You cannot learn without reacting vigorously and persistently, so put forth your best efforts in working out the proposed exercise.

If teachers themselves use inefficient procedures in learning, there can be no high hopes for their teaching until efficient methods have been inculcated. Teachers should constantly experiment upon themselves to acquire a deeper understanding of how learning takes place. So many teachers have never really examined or tried to analyze painstakingly how objectives were attained in their own learning, or their failure to attain them. Many of us breathe just naturally without making an analysis of how we breathe, but surely we cannot treat learning so lightly, or we will expect pupils to learn naturally without analysis on their part or by teachers. Learning is a science governed by the laws of the mind, and any gross violation of these laws retards educational progress. Learning is reacting, but the kind of reacting always influences the kind of learning. The purpose of teaching is to bring about the best learning; and, consequently, attention must be focused upon the reactions which in turn determine the character of learning.

Analysis of learning poetry.—Here is the last stanza of "The Chambered Nautilus" by Holmes:

> Build thee more stately mansions, O my soul,
> As the swift seasons roll!
> Leave thy low-vaulted past!
> Let each new temple, nobler than the last,
> Shut thee from heaven with a dome more vast,
> Till thou at length art free,
> Leaving thine outgrown shell by life's unresting sea!

This stanza, or the entire poem, is considered so beautiful that English teachers often require pupils to memorize it. Let us assume that you have required the memorization of this stanza by pupils, or that you as a learner have selected it as worth memorizing. What activities will you direct pupils to use, or use yourself, in the process of memorizing it?

Memorization of the stanza may be taken as an acceptable procedure for analysis. If you can recite the stanza, you have the ability to make a prompt mental response. You employed the memory process in developing ability to recite the stanza quickly and accurately. The author has often asked prospective teachers what they would do if their aim was to have pupils learn and remember the stanza. Quite often answers such as this one are volunteered: "Well, if it must be memorized, the only thing to do is to assign the poem to be memorized, and then check up to make sure pupils know it; it is a matter of keeping at it until it's learned." After a few of these suggestions, the stanza is assigned to be memorized before the next class meeting. Needless to add, students recite the poem well at the specified time, but for some reason they remain as silent as Quakers when these questions are asked: What is a nautilus? What is its life-history? What had Holmes in mind when he spoke of mansions? What is there in your soul which is low-vaulted? Are you planning to leave some outgrown shells by life's unresting sea? What new temple with a dome more vast are you letting shut you from heaven? Silence—and for a reason! Let us investigate.

1. In the first place, these future teachers did not have the necessary understanding; they had prompt mental responses, to be sure, but of meaningless symbols. They could not tell what a nautilus was; they could not draw a picture of one. The beginning activity in really learning this poem should be activity needed in getting a real or imaginary picture (percept) of the development of a nautilus, the shell and its chambers, the losing of the shell—in short, the life-history of the nautilus. Whatever one sees, manipulates, touches, pieces together, and visualizes develops a percept; so the percept of a nautilus must be developed by a blackboard sketch, a real picture, a word picture, a model, or by observation of a real shell; of course, a living nautilus would produce the best percept. The percept should be as clear as the percept of a tree or a rose.

2. With the percept established, the second activity should be one resulting in ideas which are necessary to give true meaning to the stanza. "Leave thy low-vaulted past" has a meaning which

is as difficult to grasp as is a theorem in geometry or a problem in science, and to get this meaning requires an activity called reasoning. And you, patient reader, do you plan to leave your low-vaulted past, and in what way?

3. There is still to be made by the learner a change within himself, for without this inner transformation the prompt mental response is empty and profitless. Whoever memorizes this stanza without feeling a little ashamed of his past and more concerned for his future commits it to memory perfunctorily, while he who blushes and simultaneously feels desirous of doing better learns it by heart because a feeling of his own has been so beautifully expressed by the poet. Blushing in shame and feeling the urge for nobler deeds are gained through learning shaded and colored by the emotions. Learning that water boils at 212° Fahrenheit is rote memory, but learning to feel and to be apprehensive about one's conduct is emotional; the former is cold storage of a fact, the latter is alive and vibrant.

Analysis of science.—In this teaching situation the teacher's aim is to direct pupils in their learning so that they understand why there is continuous day at the North Pole region during a part of the year and continuous night during another part of the year. Yesterday the assignment of pages in the textbook covered this material, but the answers to the teacher's questions clearly indicated that the pupils did not get the meaning. Under these circumstances, the teacher felt it her duty to give the pupils an insight into the phenomenon. She proceeded as follows:

Boys and girls, this is something that you should know and, while I explain it, pay close attention. First, keep in mind that the earth leans on its axis 23½ degrees; it is not perpendicular like the flagpole in the schoolyard. It leans. While the earth rotates on its axis every twenty-four hours, it is making another movement; it revolves around the sun, but it takes one whole year to make one complete revolution around the sun. This is the point you must keep in mind: while it revolves around the sun, the axis always points in the same direction. Now, at one time of the year the North Pole end of the axis points or leans toward the sun, and since we are living in the North Temperate Zone, we are in the light longer than we are in the dark, and those people right near the Pole are in the light all the time because, while the earth rotates, those people never are rotated out of the light of the sun. While we have summer, the Eskimos at the North Pole are

having their long days, twenty-four hours of daylight. Six months later the axis leans away from the sun because the earth has revolved halfway around the sun. At this time we have our short days and long nights, and the Eskimos at the North Pole have their continuous night because they never rotate into the light of the sun. Are there any questions? Does everyone understand that?

Not one pupil could explain it, or even answer simple questions about it. What principle of teaching was this teacher overlooking? Answer this question before you read more.

It so happened that the county superintendent of schools was visiting the class that day. During the time the teacher lectured, he listened quietly, and at the end, when pupils seemed so utterly lost, he asked the teacher if he might try his "luck." Permission was granted. Down came the globe (a new one suspended by rope and pulleys), an imaginary object represented the sun, the globe was tilted 23½ degrees, a wire was put around the globe to show the half covered by the light from the sun and the other half not touched by the sunlight; a chalk mark represented a place near the North Pole; the globe was rotated, and, sure enough, that chalk mark remained in the lighted half during a complete rotation, during the whole day, or twenty-four hours. Was there a place that might be in darkness during a whole day? Yes, several pupils volunteered answers. Where must the globe be in order to change conditions completely? In less than fifteen minutes everyone in that class knew thoroughly the reasons for continuous day or continuous night at either pole. These pupils could ask intelligent questions and answer difficult questions about the problem at hand. Why was there this difference in learning within fifteen minutes?

Too frequently a teacher mistakes her ability to lecture as the primary qualification for teaching. She mistakes teacher activity for pupil activity. Pupils cannot have knowledge pushed into them by teacher activity alone; they must work for it. "There is no royal road to learning." The superintendent realized that, although the learning of the pupils must be directed, they must learn by their own activity. He set in motion the pupils' capacities to observe, to visualize, to reason, to see cause and effect, to make meaningful conclusions, to figure out relationships, and to

gather materials leading to understanding. Indeed, these activities are real and fundamental; there are other activities in class work besides the obviously muscular ones of sawing, painting, drawing, cutting, pasting, handling, and nailing. Verbal broadcasting of information at pupils, in the hope that the vibrations of the eardrums will be activity enough, will not suffice. If pupils could be given an education by lecturing at them, we could have in six months' time the best-educated boys and girls that ever walked on this earth.

Our analysis shows that these two persons had the same objective in mind: the teacher, evidently, feebly understood the place of self-activity in learning and did practically all the work herself; the superintendent, on the contrary, did little work. He set the stage for learning, and the pupils did the work and actually attained the objective. Let us assume, however, that both realized the importance of self-activity. How did it come about, then, that pupils failed to learn in one case and learned rapidly in the other? Think this question through carefully before you proceed with your reading.

The teacher depended upon pure listening to words followed by memorization of these words as the activities necessary to secure an understanding of the cause of long periods of light and darkness at the poles. The superintendent depended upon seeing and reasoning as the activities needed to secure understanding of the same phenomenon. Two persons may know that self-activity is required but may vary to extremes in the kind of activity they think should be set into motion. Surely, activity alone is not enough. The operator of an automobile may exert himself to the point of exhaustion when he tries to make his stalled car run; he may hammer the engine, pound on the tires, step on the starter, pull the choke, and yet the motor may not make even a weak sputter. The point is that the right kind of activity is essential. So, in teaching, the activity of pupils should not be just any kind. It must be the kind that produces results; it must agree with the learning appropriate for attainment of the objectives—in short, it must be sound, psychologically reliable. Memorization of words may also fail to produce insight, no matter how active

one may be while memorizing. Probably experience with reality is needed; probably reasoning is necessary. The task, then, for the teacher, is to direct self-activity so that it is in keeping with the types of learning involved in attaining the objectives under consideration.

Classes of objectives and types of learning.—In following through the task of teaching one stanza of poetry, one becomes aware that there is more involved than assigning the poem to be memorized and checking up to see that pupils do it. There were more aims than the one of making a prompt oral response of the words; there were percepts, ideas, and inner emotional changes as well as ability to recite the stanza, and probably memorization of the words of the poet could be waived as an aim entirely. Reciting the words, as a learning activity, was not sufficient for the attainment of the objectives. The understanding of the causes of continuous light and darkness at the poles during certain times of the year can be secured more effectively and economically by employing certain kinds of learning activities. It would be an endless undertaking to consider the sound learning activities underlying every aim because there are hundreds of aims; therefore, it is imperative that aims be grouped into classes and then the expedient methods of learning each one of the classes can be decided. The classes of objectives and the type of learning chiefly involved in attaining the objectives in each class are as follows:

TYPES OF LEARNING	OBJECTIVES
Sensory Experience	*Percepts:* size, color, shape, substance, operation, sound, taste, temperature, appearance, length, width, hardness, softness, texture, composition, dimension
Memory	*Prompt Mental Responses:* names, dates, facts, rigid associations, rules, formulas, laws, principles
Motor	*Skills* (prompt physical responses): writing, singing, dancing, swimming, operating machines, throwing a baseball, typing, threading a needle, pronouncing
Problem-solving	*Concepts:* causes, effects, reasons, relationships, interrelationships, applications, conclusions, generalizations, inferences
Emotional	*Personal Attributes:* appreciations, enjoyments, tastes, attitudes, ideals

Choosing the right activities in directing study can be done best by knowing the types of learning and the most effective activities included under each one. Both the types and the ingredients of each type need scrutiny to enable one to direct self-activity along psychologically sound lines. In very few instances is only one type of learning sufficient; there is generally a combination of several types, and the proper combination should be determined carefully. Before one type or a combination of types is decided upon, the nature of each type and its components should be known. The discussion in the following five sections leads to this end.

SECTION 1. THE SENSORY EXPERIENCE TYPE OF LEARNING

Some writers refer to the sensory experience type of learning as a perceptual or observational type. Because students are prone to interpret percepts as visually formed, the author has changed the term so as to include percepts originating in any sense organ.

Practically all knowledge is connected in some way with the world of persons or objects. In early life the child begins to recognize his mother, her smile, her voice, the spoon, the bed, the milk bottle, the red ball, and a host of other objects and qualities. As he grows, his experiences become more complicated; he gains information about plants, animals, persons, places, minerals, machines, instruments, sounds, colors, weights, dimensions, forms, motions, tastes, and other sensory acquisitions too numerous to mention. Even his notions of honesty, cleanliness, kindness, and politeness are associated with someone in his environment. The most complex learning depends upon sensory experiences. Through the microscope the bacteriologist learns to recognize germs; through the telescope the astronomer learns his planets and stars. The botanist must learn to know his plants, the biologist must study cells and organs, the chemist must distinguish one element or compound from another, and the entomologist must differentiate among thousands of insects. Surely, sensory experience plays a vital part in the development of knowledge and ideas. Sensory experience learning designates activity

through seeing, hearing, tasting, smelling, touching and handling the content of environment. The products resulting from this activity are called "percepts."

Words not substitutes for percepts.—Not long ago the author visited an arithmetic class in which pupils were studying the metric system of measurement. The pupils had been and were memorizing facts about the metric system: 1 meter equals 39.37 inches; 1 liter equals 1,000 cubic centimeters; 1,000 meters equal 1 kilometer; 10 centimeters equal 1 decimeter; 1,000 grams equal 1 kilogram, etc. They were changing meters to centimeters, meters to kilometers, grams to kilograms, cubic centimeters to liters, miles to kilometers, pounds to grams, etc. Around the room there were no yardsticks, meter sticks, gram weights, quart measures, liter measures; there was not a concrete representation of a single measure—there was not even a representation of one in picture or sketch. I asked the teacher if she would allow me to ask the pupils a few questions, and she gladly consented. Six of the pupils, selected at random, were asked to go to the front board and draw a line one centimeter long. In response to this stimulus, six lines were drawn, with lengths ranging from about one inch to three feet; the majority were about one foot long or over. Six different pupils were next asked to appear at the board and draw a line one meter long. This stimulus brought out six lines, ranging from less than an inch to about four feet; the majority were about one foot long. Following this, the class was asked to judge the number of grams in a lead pencil about four inches long. Some of the pupils, being critical, insisted on handling the pencil before venturing answers. The answers varied from one to three thousand. In response to the final question, which was to name something one kilometer from them, pupils mentioned the teacher's desk, the flagpole in the schoolyard, the post office (four blocks away), and a city ten miles away.

The learning of these pupils was bereft of percepts because of their total lack of sensory experience with the metric system of measurement. Has one really and profitably learned if he is able to spell *a-p-p-l-e* and to pronounce it and then is not able to distinguish an apple from a grain of wheat or a watermelon? Has

one really and profitably learned the meaning of centimeter if he is not able to tell whether or not it is about the length of a city block or the thickness of a lead pencil? Too much learning in school is so meaningless because it is never tied up with realities. Words! Words! Words! We demand that the surgeon know unmistakably the nerves, the arteries, the muscles, the organs, and the structures before he is allowed to operate; this precise sensory experience learning is a vital part of his professional education; his learning would be lamentably incomplete, even dangerous, without it. Yet in so much school work the sensory experience type of learning is omitted, resulting thereby in purely memorized symbols without meaning or precision supporting them. Indeed, it is not real learning at all; it is forced pretense for learning. Words cannot be divorced from the realities for which they stand; if words and realities are thus divorced, the pupils grope and stumble and fall in utter dismay, regardless of the effort expended.

Gates and his co-authors of a recent book in educational psychology show the direct relationship between the meaning of words and firsthand experiences:

> Learning activities in the early stages of reading illustrate the process of developing word meanings by using verbal symbols in connection with actual experiences, and later using words to represent these experiences. The background for reading is often an excursion, let us say, to a grocery store, a zoo, or boat. As the children explore, watch what the clerks, animals, or sailors do, or actually perform some operations themselves, the teacher is careful to use words that characterize these experiences. The pupils, too, are encouraged to use the same words—to verbalize their experiences while they are enjoying them. Back in the classroom, the children and the teacher talk over their recent experiences. They use the words they heard and spoke "on location." But now the concrete situation is absent. The words fulfill a representative function—they signify what the children saw and heard and did on the excursion. As the discussion proceeds, the teacher may write on the blackboard a series of sentences describing their experiences. This becomes the content of a *meaningful* reading project. What meaning do the pupils get when they read these statements? Just what the symbols stand for—their experiences in the store, or the zoo, or the boat. In a very real sense, they do not get meaning *from* the printed material, but *take meaning to it.*
>
> This illustration suggests a fundamental general principle: words mean

only what they represent in our experience. Poverty of ideas is therefore associated with meagerness of contact with the world of things and persons.[1]

THE DEVELOPMENT OF PERCEPTS AND THEIR IMPORTANCE

In teaching, the first prerequisite is to determine carefully the part that percepts must play in whatever is to be learned. Considering this from the psychological aspect, one can say that the words used to express ideas cannot go beyond the percepts that the learner has of these word-expressed ideas. If the learner has the percepts, he will comprehend the words; if he does not have the percepts, he should begin his study by securing them. Our example of pupils studying the metric system found them without percepts, hence they knew little or nothing about the system; they were memorizing word symbols without percepts of these symbols. The moral in teaching is: Whenever the experiential background of pupils is insufficient for them to proceed understandingly, build up the needed background through sensory experience learning.

There are two situations in which the experiential background is inadequate: (1) when the percept needed has never been formed and (2) when a percept already formed is not used in the interpretation of a new learning situation.

Percepts not yet formed.—In the first situation the background of experience has never been acquired. Percepts are often needed at the very beginning to give foundation to what follows. Several examples will show how important it is to develop percepts early in striving for certain objectives.

1. First, there are those aims demanding *visual* percepts of size, form, and structure of objects. Our case of the metric system falls under this group of objectives. Because pupils had never experienced the system, their background was deficient and called for initial strengthening by means of perceptual material. In some instances percepts are gained through experiences with real things, and in other cases they are formed through

[1] A. I. Gates, A. T. Jersild, T. R. McConnell, and R. C. Challman, *Educational Psychology* (New York: Macmillan Co., 1942), pp. 428–29. By permission of the Macmillan Company, publishers.

representations of real things, but formed they must be. Botany, biology, chemistry, physics, industrial arts, domestic arts, and bookkeeping are examples of subjects in which innumerable percepts of genuine objects can be acquired. Many teachers talk about weeds, flowers, trees, grains, and insects, without making the least effort to have pupils secure visual percepts of them, and all this goes forth in an environment bountifully teeming with live content. There is the classical illustration of the boy attending a school located on the bank of the Hudson River, who, when he was asked in class to tell what the little line on the map was, answered, "The Hudson River"; and then, when asked if he had ever seen the Hudson River, replied, "No." There is also the story of the boy who studied lumber measurement but had never seen a board foot. Likewise, many have memorized "The Chambered Nautilus" without having the faintest percept of the object around which the ideas of the poem are centered. What a reminder in these stories for teachers everywhere! Whenever the perceptual background of pupils is insufficient to enable them to visualize the thing being studied, add meaning and reality to their background through sensory experiences.

2. Among objectives in which percepts have not been formed are those requiring percepts of *sound.* Foreign languages abound with aims supported by sounds. Pronunciation in English is derived chiefly through percepts of sounds. Too little emphasis has been placed upon the potency of sound as an educational influence, and yet correct sound percepts are often indispensable if progress is to be made. Pupils from homes in which English is poorly spoken accept the wrong sounds as genuine, and the mistakes in grammar and pronunciation made by such pupils are really the results of wrong sound percepts which have been deeply ingrained.

3. Third among aims which need support from experiential background are those depending upon *growth* and *motion* percepts. In the example already cited involving an understanding of conditions bringing continuous periods of light and darkness, alternately, at the poles, learning was initiated and greatly promoted by percepts of motion and, of course, by percepts of posi-

tion. A working knowledge of a gas engine is almost impossible to secure without basing that information upon study of a real gas engine, not only the engine at rest but also the engine in motion. In this same category of objectives are those included in understanding all machines and instruments, such as steam engines, electric bells, dynamos, gas meters, gears in a car, differentials, and sewing machines. Knowing the operation of the heart is surely a motion percept of a real heart or the imaginary operation of a good representation of the heart. Many of our skills, such as dancing, swimming, walking, and writing, are supported by motion percepts. The boy who wrote his small *a*'s by beginning at the right and going left (the reversal of what should be done) had the wrong motion percept. Experiments have shown that motion percepts too immense for classroom presentation by the teacher, such as the processes in lumbering, fishing, and manufacturing, are efficiently taught through motion pictures. Growth percepts, as contrasted with motion percepts, are gained by a series of observations extending over a period of time while development is taking place in some part of the environment singled out for study, such as the life-history of moths, flies, grasshoppers, butterflies, or the growth of flowers, grains, and plants, or long and continuous transformations of any kind. If motion pictures are used to show these transformations, the stages of development can be shown in more rapid succession than in natural transformations.

4. *Position* percepts also find important places in school subjects. Geography and history require location of rivers, cities, mountains, etc. *Kinesthetic* percepts, which involve both muscular and touch experiences, are formed in learning to judge the stiffness of batter or the texture of cloth. *Taste* and *smell* percepts are needed occasionally.

Recalled or reconstructed percepts.—Many interpretations, bordering upon the abstract, can be initiated and promoted by the use of percepts already formed or easily made by reconstruction of past experiences. Using percepts as interpretative aids in new learning situations is the part generally overlooked by pu-

pils, and for that reason the teacher must foster the recall of helpful percepts in meeting complex situations.

To illustrate the use of percepts already formed to interpret new situations, the proverb "It is hard for an empty bag to stand upright" serves the purpose. While attempting to explain this proverb, pupils will always go back to some previous experience with bags and use the percepts of flour, grain, or potato bags in their explanation. They will say that the bag collapses when the flour or grain is taken out, but, of course, the explanation is purely material and not the one intended by the proverb-maker. Now, pupils do have percepts which will initiate the correct meaning, provided the percepts are recalled, and reconstructed somewhat, but the percepts are not generally seen in connection with the new situation; and in such instances the teacher should promote the recall of appropriate ones, either from real or from reconstructed experiences of the pupils. Suppose two boys are depicted: one boy comes from a home where father and mother are honest, the parents have taught the boy to be honest, and the boy grows up in honest living; the other boy comes from a home where father and mother are not honest, the parents tell their son to take things he needs, but to do it so that others will not see him, and the son grows up to live dishonestly. One day temptation comes to both boys; each boy, when walking along in a different part of the city, sees a woman lose a five-dollar bill from her coat pocket. Which one of the boys will be a really honest person in meeting this trial? Why? From this point it is easy for pupils to conclude that the boy full of honesty stands firm and upright in time of temptation and stress, while the boy with no honesty is empty and collapses morally. Who will win a five-mile race? Who will resist disease? Who will commit crime? Who will accept a bribe? The answers to these questions give broad meaning to the proverb. In every case, however, percepts of personal human relationships initiate and promote the understanding.

Another example of a more profound interpretation will be cited to show the necessity of percepts in learning, this one being taken from Shakespeare's *Merchant of Venice*. The line, "The

quality of mercy is not strained," almost always baffles high-school pupils. The diplomas of many high-school graduates are on the shelves for years before the possessors know the real meaning of that line from Shakespeare. Suppose you are pinned under your automobile on the roadside as the result of skidding. The first man who approaches along that road stops his car, comes over to you, hears your moans for help, and then says, "If you will promise to give me five dollars, I will help you out, but the money, or on I go." Being in great pain, you promise, and then pay the money after you are extricated. Some months later, on the same slippery highway, a similar accident occurs. The first man who approaches along that highway stops his car, rushes over to you, hears your moans for help, and immediately plunges in and pulls you from under the overturned car. He carries you to his automobile, takes you to the nearest doctor, and waits outside while you are bandaged; he then takes you home, and finally asks if there is anything else he can do. You thank him and offer to pay, but, no, this man says he is always ready and glad to help when help is needed. Which man showed mercy? Is that mercy if one must be paid before he will help a brother in distress and agony? Is it mercy if one must debate, hesitate, barter, and receive gain before he does a kind act? Is it mercy if one must strain his mind before he helps a man in pain, a helpless man? Who was the man who had mercy, real mercy, free and from the heart, in the story of the Good Samaritan? Can mercy be dragged out of one's being, debated in his mind, exchanged only for money, strained before kindness is shown? If one strains himself before he determines to do a noble deed, he does not have mercy, real mercy; what he does have is something other than mercy. Is a boy who refrains from stealing only because he is watched an honest boy? The quality of honesty is not strained, either; it comes without forcing or straining, as does real mercy.

This second type of percepts is as influential in initiating and fostering learning as is the first type; in the first type the backgrounds of pupils is insufficient because the percepts have never been formed, and in the second the pupils do not use the percepts they already possess in reading meaning into the new. It must

not be forgotten that the second kind, although recalled or reconstructed abstractly, is actually sensory experience learning; for without the vision or sound or feeling to act as a tangible thing, the hidden meaning in the new learning situation cannot be linked with a known reality in the environment.

In directing learning, then, the teacher should visualize accurately the part percepts play, and, if she finds or foresees that the experiential background is or will be insufficient, provisions must be made to build up this background by sensory experience learning.

THE TEACHER AS A DIRECTOR OF SENSORY EXPERIENCE LEARNING

Although one may realize the importance of percepts and the place of sensory experiences in producing percepts, yet more must be known in order to direct this type of learning productively.

Needs to determine use.—First should come the guiding principle that percept-forming activity must be brought into the learning situation in accordance with psychological needs. Teaching should never be swerved in a particular direction just to comply with a highly advertised procedure practiced elsewhere. On the contrary, instruction should be regulated according to the needs of learners. In a certain school motion pictures are shown to the science classes every week. Whether the pictures relate to the classroom work is not considered vital. The films come on schedule; they are shown on the same day every week, and the science pupils must give 20 per cent of their school time mechanically and regularly to meet school requirements. In other schools, field trips, excursions of various kinds, and visits to industries are undertaken on a broad scale to keep up with practices heard about somewhere else. A practice advertised enough gets a following, be the procedure wise or otherwise. Percept-forming materials should be incorporated so as to build up, at the proper time, the aims under consideration. For example, a trip to the museum proves valuable when pupils have an objective in mind, when they seek percepts needed for deeper

understanding or to bridge gaps in their visualization; but a visit proves less profitable when it is undertaken merely for the sake of going somewhere. In all sensory experience learning this procedure should hold: use materials when there is a psychological need for them.

Pupils to feel needs.—Preparation of pupils so that they have a strong mental-set to form percepts is another important factor in directing sensory experience learning. A temporary barrier halting progress, or a gap in experience which cannot be bridged, creates a feeling of need. When listening to a lecturer expound on a theme difficult to comprehend, one welcomes an example or illustration or story; pupils at times speak up in class for concrete examples: "Show us what you mean by iambic pentameter verse." Needs are felt by the pupils themselves, or the instructor can help pupils feel needs by proper thought-provoking stimuli: "What will we understand by remote angles when we meet that expression tomorrow?" or "How do you suppose a blind person reads?" With the need as stimulus, pupils are ready to observe those things which will satisfy the need. Preparation is, then, the arousal of a need and the directing of attention to those aspects or phases of the thing observed which meet the demands of the need. It can be comprehended that a need may range from wanting to know what remote angles are to wanting to know how silk is secured and manufactured; the means employed to give the percepts may range from drawing remote angles on the blackboard to the many complicated steps in a motion picture of silk culture and manufacture.

Percepts to be real.—Percept-forming opportunities should be as closely associated with realities as possible. The little line on a map is not at all the same as a real river; the picture of a steam engine is entirely different from a real engine; the textbook drawing of a doorbell is not a genuine doorbell; a charter or constitution depicted in words may mean almost anything to young persons. Whenever possible, then, give real and genuine and true-to-life percepts.

Common means effective.—Elaborate and expensive percept-forming apparatus or material is not needed, generally speaking,

nor is it always most effective. Probably in the great majority of cases, common and inexpensive percept-forming materials, obtained or devised by the teacher, prove most expedient. Sketches, drawings, maps, and graphs on the blackboard; instruments, apparatus, and pieces of electrical and mechanical machines in the school building or homes or factories; weeds, flowers, grains, and a host of materials from the plant and animal kingdom in the immediate environment; stories, examples, illustrations, and analogies from the teacher's experience and knowledge—all these and many others near at hand are effective and inexpensive means to produce vital percepts. A little cotton gin, made from a circular tin saw, a small box, and a few wires, may provide, with the aid of a little imagination, a true picture of the workings of a cotton gin, a percept perhaps better than would be given by a piece of expensive apparatus. The environment is full of genuine percept-forming objects. It is a frailty of human nature to look out into the far, far away, while the "Acres of Diamonds" lie at our feet.

Self-activity.—Paramount in sensory experience learning should be the exercise of the principle of self-activity to the full. In a certain class in geography, pupils handed in beautiful maps of the United States; the oceans and lakes were colored a sea blue, the rivers were there, mountains were skilfully depicted in their proper locations, the important cities were represented by almost perfect stars, and the printing was, indeed, remarkably well done. How glad the teacher was to show the work of her pupils to the principal! Not being entirely convinced, the principal asked if he might take her class for a few minutes. He sent the pupils to the blackboard and asked them to draw, without help from anyone, maps of the United States, and to show the important bodies of water, the rivers, the mountains, the cities, and to label them. What a sorrowful showing these pupils made! The Hudson and the Mississippi rivers exchanged places, oceans exchanged places, Chicago was on the Gulf of Mexico, the Mississippi emptied into the Pacific Ocean, and great changes and upheavals occurred everywhere. One would not think that the Land of the Free could change so. What the teach-

er thought was real learning proved to be mere thoughtless copying with no trace of accurate percepts behind it. The teacher did not realize that a pupil must exert himself in the right way to form percepts; the activity demanded of the pupils was not psychologically sound. Too much sensory experience learning is ineffective because pupils are passive; they are never held for a real test of their learning. At other times, pupils have no opportunity to manipulate or investigate, or they have no time to make the percepts a part of themselves. A teacher of physics in a small high school required, as a part of the final examination, an individual conference in the laboratory in which each pupil was to explain and demonstrate the motor, dynamo, steam engine, gas engine, doorbell, telephone, etc., by actually manipulating, and by describing processes and principles of these instruments and machines. Before school, after school, during free periods, and in laboratory periods, pupils were found studying and manipulating these percept-forming materials. There is a difference between naming ten weeds and identifying ten weeds displayed before one; the former is memorization of symbols, the latter is a test of percepts made. There is a difference between drawing a map of the United States with its rivers and cities and mountains, using a textbook map as a guide, and sketching that map with only past percepts to guide or lean upon. Enough has been given to bring forth this fundamental guide. *Set the stage in sensory experience learning so that pupils are not passive but genuinely active.* Passivity leads to fleeting percepts; genuine activity leads to real and lasting impressions.

THE TEACHER AS ONE OF THE BEST AUDIO-VISUAL AIDS

In these times when audio-visual aids are receiving much credit for their effectiveness in promoting learning, one aid is seldom mentioned, namely, the teacher. Right there before pupils is a vibrating, pulsating, and living specimen. She can be seen and heard. No screen is required, no mechanical sound needs to be produced, no electrically run apparatus is demanded. This aid is the real thing. Pupils see and hear this aid every day for months and years.

The teacher herself sets before young boys and girls some examples of the most precious of all learnings. Experiments show that restless and irritable teachers make pupils restless and irritable. On the other hand, those with pleasing and congenial traits make youngsters happy and active. Society wants its youth to become broad-minded, tolerant, polite, honest, sympathetic, and loyal. We have depended upon rules and memorized materials to do the trick. Those who have and display these traits as they live and work with our children produce more abiding learning than all the tricks and mechanical means combined. For many kinds of learning, the teacher is the master visual or auditory aid.

In those areas of learning known as appreciations, attitudes, and ideals the impact of the teacher is tremendously important. Moral and character gains are basically the effects of human example and stimulation. If a teacher fails to make pupils better because of her associating and working and being with them, she has missed one of her most effective means of promoting growth and development. We cannot deceive pupils. They are keen observers and listeners. What the teacher is now, pupils are learning to become.

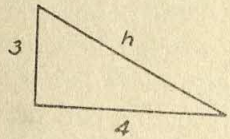
If the seeing of a motion picture produces significant changes in attitudes, is it not reasonable to believe that the pupils' constant observation of the real-life drama of a teacher in action should produce more profound changes in attitudes? Is not a teacher through her portrayal of sincerity, sympathy, patience, outlook on life, broad-mindedness, and scientific interest as effective a visual aid as a slide or motion picture? Cannot one learn by seeing a living demonstration as well as from watching a mechanical performance? The sociological force of the teacher is being recognized as an essential and vital component in the resulting power of method, and this is especially true when the so-called intangibles of learning are concerned. Yet, one must not look upon the intangibles as accidental, for they, too, are learned; but these intangibles must be present in the learning environment before they can be gained. Very little, if any, is learned by accident; in every case the indirect learnings are

actually promoted by something present acting as a stimulus. You cannot "catch" anything if it is not there to be "caught." Even the elusive and subtle moral and character learnings may be acquired incidentally but not accidentally. The genuineness of strong personal attributes in the teacher fosters within pupils every one of these subtle developments that are commonly but erroneously said to be "caught and not taught."

Actually sensory experience reaches out to the personal and social and moral influences exerted by one person upon another. The concept of audio-visual and other aids must be expanded to include more than motion pictures, specimens, graphs, drawings, and other commonly accepted aids; this concept should include the words, deeds, actions, and behaviors that are seen and heard and experienced as one lives and associates with others.

OPPORTUNITIES FOR THE READER TO PARTICIPATE IN SENSORY EXPERIENCE LEARNING

The more one experiences in his own learning, the more sensitive he becomes to the course of learning in others. To enrich the reader's feel of study processes, two exercises are provided, and it is hoped that the reader will watch carefully for the part percepts play in the course of learning.



$$h = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$

FIG. 5

A common problem in mathematics is that one dealing with the sides and the hypotenuse of a right triangle. In a right triangle the square root of the sum of the squares of the two sides equals the hypotenuse (Fig. 5). Pupils work problems of this type readily, but, when a problem of a little different setting comes, difficulties of a serious nature are encountered.

As the chimpanzee, described in Köhler's *The Mentality of Apes,* sat in its cage and reflected upon the whole situation of fruit too far away from the cage to be reached, so will many pupils sit in their seats and think about a problem too far away

in difficulty to be solved. In the environment of the ape there were two bamboo sticks with hidden potentialities. In due time the chimpanzee saw how these two pieces of bamboo, lying innocently in the cage, could be fitted together and probably made long enough to reach a banana outside the cage.

Sultan first of all squats indifferently on the box, which has been left standing a little back from the railings; then he gets up, picks up the two sticks, sits down again on the box and plays carelessly with them. While doing this, it happens that he finds himself holding one rod in either hand in such a way that they lie in a straight line; he pushes the thinner one a little way into the opening of the thicker, jumps up and is already on the run towards the railings, to which he has up to now half turned his back, and begins to draw a banana towards him with the double stick. I call the master: meanwhile, one of the animal's rods has fallen out of the other, as he has pushed one of them only a little way into the other; whereupon he connects them again.[2]

How will it be with human beings when problems are too far away in difficulty to be solved? A room is 20 feet long, 15 feet wide, and 9 feet high; how long must a string be to reach from the lower left-hand corner to the upper right-hand corner? Find the length of the string. Could you do it if you knew how to perform the mathematical calculations? Could you explain how the length of the string might be found if somebody would do the figuring for you? Now, the how is the more important part. Look around the room in which you are now sitting and see if you can see a triangle of which the string is the hypotenuse. Do not be satisfied with one triangle; you should see a half-dozen triangles that might be used in helping you to solve the problem. After the problem is solved, ask yourself this question: "What part did percepts play in this difficult learning situation?"

Your second opportunity to participate in a learning exercise is related to astronomy. The first four lines in "Snow-Bound" by Whittier are:

> The sun that brief December day
> Rose cheerless over hills of gray,
> And, darkly circled, gave at noon
> A sadder light than waning moon.

[2] Wolfgang Köhler, *The Mentality of Apes* (New York: Harcourt, Brace & Co., Inc., 1926), p. 132.

This part of the poem mentions *waning* in reference to moon, but much more should be known about that heavenly object because it plays a prominent part in songs, romances, superstitions, and verbal usages. What do you know about the moon? What do "waning," "waxing," "first quarter," "third quarter," "new," and "full" mean when applied to the moon? If you were asked while strolling some evening when the moon was visible whether it was waxing or waning, would you be able to give the correct answer? Would you be able to tell whether the first quarter was coming or past, and could you do the same for the third quarter? Where is the moon when you do not see it at all for several days? What causes these changes in the moon? Your problem, now, is really to understand these causes. After you understand, go back and figure out what type or types of learning proved most effective in bringing about that understanding. If you were to teach so that pupils secured the same degree of understanding, how would you teach? If you do a conscientious job in this learning exercise, you will have gained some knowledge about the psychology of learning and methods of teaching that can be truly learned only through experience.

Function of sensory aids.—Within recent times the use of sensory aids has greatly expanded, especially in the educational program for the armed forces during the war. This program was an increase in emphasis, not a fundamentally new concept. It is true that our schools have put too much emphasis upon the written or spoken word as the medium of learning while not enough has been placed upon real or representative mediums. All sensory aids are truly materials of instruction; they are means to ends. Sound motion pictures, field trips, excursions, laboratory experiments, and many other forms of contact with reality should be viewed as means in the guidance of learning and not as externals or extras. Sensory experience learning includes all of them. If one is a good educational psychologist, he will sense the time when learning is greatly facilitated by the use of sensory experiences. It is not necessary, therefore, to give rules and schedules for the correct implementation of instruction through sensory aids to one who knows why he proceeds as he does. The directive force of understanding will guide his judgment.

APPLICATION EXERCISES

1. It is not unusual for rural children to make trips to cities, but now city children are making trips into the country. Can you tell why the latter movement came about?
2. Just how is the stitch made by a sewing machine? If you know, explain the principle to somebody who does not know and watch his expressions and the questions he asks. If you do not know the principle, just what is it that you feel needs to be done in the process of learning?
3. "Kites rise against, not with, the wind." How would you teach the real meaning of the line to a dull group?
4. Do you know the area of France in square miles? Texas? France could be placed within Texas with enough area left over to make about ten states the size of Connecticut. How wide is the Atlantic Ocean in miles? Imagine a hinge on the United States at Boston, then, if the United States is turned over, the western coast will just about touch Europe. What purposes are served by these illustrations as contrasted with memorizing the areas in square miles or distances in miles?
5. Examine newspapers and magazines to experience the effectiveness of graphs and similar means to express changes in taxes, debts, armaments, etc. Why are graphic means used?
6. Can you picture on the blackboard what $(x + y)^2$ means? In other words, graph what $x^2 + 2xy + y^2$ really represents.
7. There has been much written about techniques in using visual aids. Who thought of or discovered the techniques? If there are good techniques, upon what are they based?
8. A man can dig a hole 8 feet long, 8 feet wide, and 8 feet deep in a certain number of hours. How long will it take him to dig a hole 4 feet long, 4 feet wide, and 4 feet deep? By visualizing the two excavations, guesses and wild mathematical manipulations can be held in check.
9. A teacher with a little ingenuity and imagination can often devise inexpensive visual aids that may prove more effective than expensive ones. What aids would you use to teach the facts asked about the moon? The earth and the moon and the sun are real; you might be able to employ these real materials instead of representations.

RELATED READINGS

BOSSING, N. L. *Teaching in Secondary Schools,* chaps. xiv–xv. 3d ed. Boston: Houghton Mifflin Co., 1952.

BURTON, W. H. *The Guidance of Learning Activities,* chap. ii. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

DALE, EDGAR. *Audio-Visual Methods in Teaching.* New York: Dryden Press, Inc., 1946.

DOUGLASS, H. R., and MILLS, H. H. *Teaching in High School,* chap. xvi. New York: Ronald Press Co., 1948.

GATES, A. I., *et al. Educational Psychology,* chap. xiii. 3d ed. New York: Macmillan Co., 1948.

GOETTING, M. L. *Teaching in the Secondary School,* chap. xii. New York: Prentice-Hall, Inc., 1942.
RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chap. viii. New York: Appleton-Century-Crofts, Inc., 1948.
WITTICH, W. A., and SCHULLER, C. F. *Audio-Visual Materials.* New York: Harper & Bros., 1953.

SECTION 2. THE MEMORY TYPE OF LEARNING

Interviews with college students indicate that more than 60 per cent of the students in college believe that the chief duty of college students is to memorize the information which their instructors consider important. The emphasis given to the recall of facts in typical college examinations is one of the chief reasons for the existence of this belief. The vast majority of examinations mainly require students to remember and state facts presented in textbooks and lectures. It is not surprising that students think of memorization as the fundamental requirement in education.[3]

Probably no other type of learning is used more frequently in secondary schools than the memory type. This assertion does not imply that the type should be used more frequently. One must always determine the most desirable ends first, and then select the type or types of learning needed to reach the ends most expediently. The first concern is to investigate the products of learning called prompt mental responses.

These responses, as the phrase denoted, are so thoroughly fixed in mind that they can be used promptly when situations requiring them arise. One's name, the days of the week, the months of the year, dates in history, correct spelling, poems, formulas, names of persons and things, and facts of various kinds are examples of materials which can be prompt mental responses. A good speller is one who can spell a large number of words quickly and accurately; the efficient adder and multiplier finds the right answers to addition and multiplication problems promptly; a public speaker recites poems and quotations freely; the person speaking a foreign language fluently uses many words which he has reduced to prompt mental responses. Materials employed to meet mental demands promptly and accurately have been memorized.

[3] C. H. Judd, *Education as Cultivation of the Higher Mental Processes* (New York: Macmillan Co., 1936), p. 6. The quotation is taken from chap. ii and was written by R. W. Tyler. By permission of the Macmillan Company, publishers.

Knowing that there are and should be quick mental responses is the starting-point in the treatment of this type of learning; but the major task is to investigate the mental activities that should go on before the prompt mental responses emerge as genuine end products.

BACKGROUND NEEDED FOR MEMORIZING

Let us suppose that a particular aim is to be so well learned that it can be reproduced promptly. The names of the thirteen original colonies, a poem such as "A Psalm of Life," a rule in spelling, the positions in the president's cabinet, the formulas for changing Fahrenheit degrees to centigrade degrees and vice versa, formulas for finding areas, theorems in geometry, and the definition of iambic pentameter verse are common materials often memorized. Recall the comment of the student in connection with "The Chambered Nautilus": "Well, if it must be memorized, the only thing to do is to assign the poem to be memorized, and then check up to see that pupils do it—it's a matter of keeping at it until it's learned." It is sincerely hoped that the reader will not hold the same procedure inevitable in all instances where prompt reproductions are desired. Too many teaching obligations lie pathetically undisturbed under that hazy and unprofessional prescription: assign, check up, and grade. In the last stanza of the poem referred to earlier, it was evident that activities of an entirely different character should have preceded the memorizing.

Let us assume that the positions in the president's cabinet are so vital that they should be memorized. Several ways are open to a teacher. She may say, "These positions you must know so come prepared to recite them tomorrow," or she may give some mnemonic device to follow, as "St. Walpadic" (each letter stands for a cabinet position), or she may proceed as here illustrated:

"Each cabinet member has charge of some important work that the government does for us or helps us to do. Between now and tomorrow, I want you to look around and see what important work you see people engaged in, right here in our town. Probably you will see some persons who work for the government; you might hear something over the radio. Look on bottles

of medicine and packages of food; examine the newspapers; watch for signs of U.S., for this sign means that the government is interested." The next day the class, with the aid of the teacher, figured out the positions:

PUPILS' OBSERVATIONS	POSITION
Dulles visits ten European countries.	Secretary of State
Saw a ten-dollar bill marked: "United States of America."	Secretary of the Treasury
Congress appropriates money to help educate children in defense areas.	Secretary of Welfare
Government intensifies campaign for expelling undesirables from this country.	Attorney-General
United States government intervenes in strike.	Secretary of Labor
Saw a truck marked "U.S. Mail"; building marked "U.S. Post Office."	Postmaster-General
Read a bulletin on raising sheep published by the United States Department of Agriculture	Secretary of Agriculture
Aviation company is given contract to make jet planes for the United States.	Secretary of Defense
United States Indian Reservation.	Secretary of Interior
Saw labels: "Registered in the United States Patent Office."	Secretary of Commerce

Using the findings of these pupils and expanding their ideas when necessary, the teacher helped the pupils to develop the names of the ten cabinet positions and a few duties connected with each one. Pupils began to experience in their own lives how close to them was the work of the cabinet members and their assistants. When the teacher did test for recall (memory) of these positions, the pupils responded remarkably well; their memory work was preceded by activities in learning which fostered recall. If possible, then: *Before asking pupils to memorize, build up a background of meaning in which the materials to be memorized can take root, grow, and hold fast.*

Maximum use of background possibilities.—The background, of course, cannot be developed to the same degree with all materials, because some materials admit of strong associations and meanings, while others have feeble, background-producing possibilities. The tragic part, however, is the rote memorization of

materials which do have deep and abundant memory fixation possibilities. Again, many teachers seem to think that the recitation of word symbols is the real test of accomplishment, whereas this reiteration is usually an echo of sounds from hollow places. Reiteration is too often only veneer, deceiving the teacher and pupils alike as to the knotty, cross-grained, unseasoned, and cheap wood beneath. The shabby cloak of rote memory must not be worn and assumed to be a real garment; real learning cannot be imitated. Memorizing should be the fixation of ideas after these ideas have been mastered; it should not be the attempted fixation of ideas before they are mastered.

Responses with feeble background possibilities.—Even in those materials with feeble background possibilities, a hint, a suggestion, a percept, or a clue of some kind can be given. The names of the thirteen original colonies can be memorized better if one gains a percept of them in contiguous arrangement on a map, and probably the percept in this case is more valuable than the mere verbal or written names of them; in chemistry, H is the symbol for hydrogen, O for oxygen, Fe for iron, and K for potassium, but a simple hint that the last two come from the Latin words *ferrum* and *kalium* helps in forming a background for memory; water boils at 212° Fahrenheit, to be sure, yet the watching of the mercury rise and stop at 212° as one observes the thermometer in the water coming to a boil, adds a background of reality for this fact; pi may be 3.1416, but to the pupil who has found in his own simple experiment that the circumference of a circle is a little more than three times the diameter, this ratio means more than a rhyme in repeating numbers. So many definitions, theorems, and rules, reduced to prompt mental responses by hard and laborious memorizing, could be almost as well worded by the pull of a meaningful background, to say nothing of the immeasurably better learning and retention.

Responses with strong background possibilities.—Many situations in school and in life require the knowing of a series of ideas, points, provisions, reasons, causes, or events which must be so learned that they can be given quite promptly, although not so promptly as names, dates, formulas, rules, definitions, or

materials learned verbatim. It is this kind of mental response which admits of rich and strong associations and meanings to support and facilitate memory. The tragedy in using rote memorization to bring forth these responses is decidedly more serious than it is with prompt mental responses having relatively feeble background possibilities. To the activities that should precede quite prompt mental responses, attention will now be directed.

First in order is a clear notion of the nature of the materials with strong background possibilities. The materials to be reduced to relatively prompt mental responses will be the answers to such situations as: What are the provisions of the Monroe Doctrine? Give six weaknesses of the Articles of Confederation; Enumerate the chief events leading up to the entry of the United States in World War II; What are some of the laboratory methods used to prepare oxygen? What differences are there between the teachings of Christ and Mohammed? What reasons can you give for having a Congress of two houses rather than one? These responses are distinguished from those of the first group by their broad and general character, their continuous and associative development, their summarizing potentialities, and their yielding to various individual ways of expression.

In directing the activities preceding the memorization of these materials, this principle should be the guide: Build up a background in which the materials to be memorized can take root, grow, and hold fast. Attention is focused, however, upon the *take root and grow* parts, for the act of memorizing will be quite easy and permanent if the background preceding memorization has been developed; in fact, it is in this background that the materials to be memorized germinate, develop, and take strong roots before the holding-fast part need be considered. Suppose that the teacher has for an aim in history the correct answer to this question: "In what six ways did the Articles of Confederation prove to be weak?" There are several ways for her to proceed. She may ask pupils to come prepared tomorrow to give six weaknesses; she may list the six faults on the board and have pupils copy them into their notebooks and memorize them for the oncoming

test; or she might proceed as illustrated in this actual classroom teaching:

"Do you think our government today is successful?" An affirmative answer brings another question: "What is it that makes our government successful?" Such points as securing money, protecting itself, keeping order, etc., are given by the pupils. At this point the teacher reads several passages from the Constitution. "We are governed by a set of rules giving our government certain powers; a few of these powers I just read and explained." She continues: "At one time we did not have our present Constitution and our present successful government; during the time of the Revolution and a few years afterward, we had a form of government under the Articles of Confederation (set of rules), and this government was very weak and unsuccessful. Do you think you could figure out why it was weak and unsuccessful?" Pupils did give some good reasons. "Well, possibly you are right, or you might be wrong. Tomorrow we shall read about the government under the Articles of Confederation; try to figure out just what happened and why it happened; there are reasons for everything; if something was successful, why was it successful? If, on the other hand, something didn't work, why didn't it?"

The discussion on the following day was fruitful; pupils developed the topic, and, aided by a question here and there from the teacher, listed the important causes of the weaknesses of the government under the Articles. Time after time, pupils reasoned out why conditions in the classroom, the club, the home, and the community would be bad if rules in the Articles were applied to these smaller units. During this time pupils were building up a background of meaning and understanding and insight. At the close of that lesson the material had taken root and had grown and developed; a background had been created. The fixing of the shortcomings of the Articles (memorization of them) is now not a matter of blind and mechanical repetition of meaningless statements but it is the activity of drawing quite promptly from a background of ideas; these ideas in turn are so well understood that they come forth with a deep and strong associative power behind them rather than through the weak push of that dissociated trying-to-remember-the-serial-notebook-arrangement or the textbook enumeration.

Brownell shows that mathematics when taught and learned by rules produces distressing results. He then points out the way to correct this weakness:

These rules our students "learn" temporarily, only to forget them, and they are then unable to compute confidently and correctly. If their learning were buttressed by understandings, which is to say, by a grasp of the mathematical principles involved, they would not thus be at the mercy of faulty memory.

Teachers of secondary-school mathematics are aware that, as a rule, high-school students know little about common and decimal fractions and about per cents, and less about ratio and proportion. When only one Army inductee in three can select the correct answer for "7 — 5¾"; only one in four, the correct answer for ".32 ÷ .64"; and only one in four, the correct answer for "5 is 20 per cent of what number?" it is obvious that something is seriously wrong. All these examples, taken from results obtained with an earlier form of the Army Classification Test, should be solved by inspection. That they are not and that they are not correctly solved even with paper and pencil is hardly explicable as a result of forgetting. Individuals who have clear insights and complete understandings simply do not forget to this extent. There is a more valid explanation for failure with such examples. This explanation is neglect of mathematical meanings.

Let teachers of high-school mathematics, once they have made good the deficiencies of earlier learning, take the vow suggested for teachers of arithmetic—to teach nothing that they cannot make seem sensible to their students. Once high-school students learn meaningfully the mathematics of algebra, geometry, and trigonometry, criticism of high-school mathematics will diminish, for both students and their elders will have evidence of the worth of their learning.[4]

More common sense ought to be used in the whole matter of selecting materials to be memorized in secondary schools. Many of the objectives of teaching do not square with the needs of everyday living. When or where in life is it a matter of reputation, honor, salary, bread and butter, promotion, usefulness, or enjoyment that one be able to reel off in chronological order the dozen or more events leading up to the Revolutionary War? Nowhere except in the classroom; in no other place will such a stilted situation ever be met again. When or where in life is one required to memorize and have at his fingertips, ready to sing out, fifty lines from Shakespeare, fifty from Milton, fifty from Keats, and fifty from half-a-dozen more famous poets or writers? At no time and no place except in the classroom. Some situations in life do require prompt mental responses, and these responses should be thoroughly ingrained. Other situations in life demand

[4] W. A. Brownell, "Essential Mathematics for Minimum Army Needs," *School Review*, LII (October, 1944), 488, 489, 490.

significant and related ideas—ideas so welded together in a background of understanding that these ideas can be recalled when needed by using the background wherein the ideas are deeply grounded and firmly established.

ACTIVITIES FOLLOWING DEVELOPMENT OF THE BACKGROUND

Having dwelt thus far upon building up a background as an essential activity in memorizing materials, a few more activities of a sound psychological nature will be treated:

1. *Recall.*—First among these is the recall activity. Recall must be differentiated from repetition; repetition is the repeating of an activity in order to stamp in the particular thing to be learned; recall is the activity involved in determining if one has the material immediately at hand, and, if not at hand, the endeavor to bring that material up in one's mind with no outside assistance. Can you recall the name of the teacher who taught you English when you were a Freshman in high school? Who was valedictorian in your high-school graduating class? Who became president following the death of Lincoln? It may be years since you were called upon to answer such questions. The activity you employ in bringing or trying to bring these names to your mind is recall. Recall, as used here, should also be considered as having a more immediate connection, that is, while learning of the material is in progress. While studying, pupils are inclined to look immediately in the textbook, notebook, or any source for the material as soon as a prompt response does not come; recall, on the other hand, is an endeavor to bring the response to the foreground by mentally finding it in the background already built up or partially built up. Recall should function during the process of memorizing for two reasons: (*a*) recall exerts a pull which helps to fix the materials and (*b*) the activity of recall is exactly the same activity exercised whenever so-called memorized materials are needed in future time.

In directing pupils to use recall, the teacher should distinguish between this activity as used in the two groups of prompt mental responses previously mentioned. The first group of responses, characterized by weak background possibilities and exact and

rapid reproduction, requires the use of recall in a strict sense because the materials do not admit of rich associations or individual ways of expression. On the contrary, materials which have strong background possibilities can be and should be recalled by reliving or re-entering or re-examining the conditions and circumstances which gave rise to the ideas originally.

2. *True-to-use activity.*—Another activity which should be used during the process of memorizing is the true-to-use activity. For example, if one desires to read and speak a foreign language, he needs to know and employ words in reading and speaking and in listening to another read and speak; in short, one needs words, different words, and he needs them separately and immediately. Yet how often do pupils memorize the words and their meanings by learning the words in the exact order that they appear in the vocabulary list on a certain page, or some such serial arrangement, without focusing attention upon each word as an entity. A certain teacher always put a list of words to be spelled on the blackboard, and at the end of the day she erased the words and dictated them in the same order as found on the board. Many of the pupils had the entire list of words written down on their spelling pads before the teacher was halfway through the list, and then these pupils sat motionless during the remainder of the dictation time. Noticing this (after several weeks of unawareness), the teacher without warning dictated the words in a mixed order. That day the spelling was very much poorer. The true-to-use activity in this case is not spelling a list of words but spelling a word, any word, when one needs it.

3. *Organization.*—The last activity to be treated is an activity falling under the principle of organization. Many writers call attention to learning by the whole as contrasted with learning by parts, signifying that there are these two methods in memorizing, or a combination of both. The classical illustration is the learning of poetry; if one proceeds in his memorizing so as to take in the whole poem simultaneously or continuously, he uses the whole method; if one memorizes one stanza and then passes on to the next, etc., until he has learned the stanzas separately and then puts each stanza in its proper place, he uses the part method.

There is, as yet, no strict rule which can be laid down to govern the directing of learning by whole, by parts, or by a combination of the two methods. The teacher must get her clues from the nature of the material as well as from the contributions of psychology.

Why is a person able to remember a joke, even to great detail, after hearing it once? Why is a person able to relate the plot and development of a fiction book just read? Why can a person go to a movie and then tell the complete story at home a few hours later? Yes, paying attention, having a good memory, and wanting to retain are good answers—but there is a deeper reason. These materials admit of piecing-together; they have the grouping and developing possibilities—in short, these materials can be organized. Why, therefore, should they not be learned as one continuous unit, as a whole? The nature of the materials plays a part, a big part, in determining how to direct memorizing. Poems, as a general rule, have some plot, story, event, or group of ideas which admit of organization; "Paul Revere's Ride," "Little Boy Blue," "Sail On," and "Barbara Fritchie" are examples of poems with organization possibilities. Lincoln's "Gettysburg Address" need not be memorized by rote; it admits of organization of ideas. The principle governing the direction of memorizing in such cases is: Whenever materials admit of organization, group the content into one continuous and complete development and learn the whole development as a unit.

The author remembers well the sorrowful and tense picture of the girl delivering her valedictory oration to parents and pupils gathered in a spacious high-school auditorium. When about halfway through the memorized oration the girl halted, looked around, blushed, twisted, and hoped, but no words came; she had forgotten the rest of the address. After several minutes of quiet in that large auditorium the girl sat down and looked at the floor during the remainder of the program. After the program was over, and the girl was off the stage, she cried pitifully. This girl memorized words; there was no meaning to come to the rescue, no organization of ideas to rely upon. Probably this girl should have had a few ideas, rounded and developed ideas, and these

she should have organized, ready to develop in her own words (not in the language of the English adviser) while she fulfilled the valedictory obligation that night. More emphasis in memorizing, upon both prompt and relatively prompt responses, should be given to the solid inculcation of ideas and their organization as contrasted with the pulling and tugging upon materials by the force of meaningless and weary repetition.

Memorizing, or the gaining of prompt or relatively prompt mental responses, is an important and often-used type of learning. Attention has been given especially to the activities that should, in so far as possible, operate in building up a strong background in which the materials to be reduced to prompt responses can take root, grow, and hold fast. Emphasis has also been placed upon principles that should be employed in memorizing after the background has been established.

You have, no doubt, discovered that in very few cases does one type of learning operate alone in attaining objectives; memorizing is generally preceded by one or more of the other types. The next step in your learning to teach is the study of the remaining types. Motor learning is treated next because it is employed when prompt motor responses or skills are the ends.

APPLICATION EXERCISES

1. Which will weigh more, a quart of cream or a quart of milk? Is there any good reason why one should endeavor to memorize which one is the heavier or the lighter? Could not one on the basis of background or experience figure out the relative weights of the quarts?
2. Why should a person memorize the formula for finding the area of a circle when a little mental work, and very little at that, will bring a formula into consciousness? Cut the circle into a large number of pieces (in imagination) as you would a pie, put the pieces together so that the outer edge of the first piece is at the bottom with the point up and the next piece has the outer edge at the top with point down, etc., alternately until all the pieces are fitted together. Keep the base line straight. What does the figure look like? What is its base? Its altitude? Its area?
3. What particular benefit comes from memorizing the capitals of the South American countries? What is the capital of Bolivia? Paraguay?
4. In a certain chain store the clerks always call a customer by his last name the second time he comes into the store. Can it be that clerks have good memories? How do you feel if a person is introduced to you half-a-dozen

times and still cannot call you by name? What makes the difference in the two cases described?

5. Suppose you visit your friend and he believes that he has a fever because he is uncomfortable and his face is flushed. There is no thermometer in the house except a small but accurate centigrade one. But you do not know what normal temperature is on the centigrade scale. On the Fahrenheit scale normal temperature is 98.6°. Could you tell whether your friend has a fever? Should the mind be burdened by carrying around a formula for changing from one scale to the other?
6. Can you think of some mnenomic device that is useful? Is there much background possibility that can be used in learning the colors in the spectrum or the number of days in the different months? Do you know of mnenomic devices helpful when one tries to recall the colors or the number of days? Would you employ "St. Walpadic" as a device to recall the positions in the cabinet? Why?

RELATED READINGS

GATES, A. I., *et al. Educational Psychology,* chap. xii. 3d ed. New York: Macmillan Co., 1948.

PRESSEY, S. L., and ROBINSON, F. P. *Psychology and the New Education,* chap. xvi. Rev. ed. New York: Harper & Bros., 1944.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chap. x. New York: Appleton-Century-Crofts, Inc., 1948.

WOODRUFF, A. D. *Psychology of Teaching,* chap. viii. New York: Longmans, Green & Co., 1946.

SECTION 3. THE MOTOR TYPE OF LEARNING

Objectives attained through motor learning are those which have a predominant muscular component in the response. One may learn while he is relatively motionless physically, as in memorizing, reasoning, appreciating, or deriving percepts; but, whenever components of motion are involved, the motor type is brought into operation. Writing, pronouncing, singing, dancing, swimming, typing, sewing, playing games or musical instruments, planing boards, driving nails, handling apparatus, and manipulating machines are typical examples of abilities based on motor activity. Again, one should remember that few abilities are gained through only one type of learning; there may be one or all four of the other types used in acquiring motor skills.

STEPS IN THE ACQUISITION OF A SKILL

For purposes of illustration, a motor skill of a somewhat simple nature is explained to show the steps a learner should take in

acquiring it, and the ideas that a teacher should use while directing the motor type of learning. The skill to be acquired is the ability to break glass tubing accurately and speedily and safely.

1. *Mind-set.*—Frequently this type of learning is initiated by some remark from the teacher, such as this: "Today I'm going to show you how to break glass tubing." Is that creation of a mind-set, or is it another task set by the teacher? It appears to be the latter. A real mind-set is an urge within a pupil, disposing him to want to know, to need to know, to want to be able to do. Here is a different approach by the teacher:

> Anyone who takes chemistry uses apparatus constantly in performing experiments in the laboratory, and glass tubing is frequently used as part of the apparatus needed. Our glass tubing comes in longer lengths than needed, so it must be broken into desirable lengths. A good chemist learns to break glass tubing easily and accurately. Some pupils believe the way to break it is to grasp it and bend it until it breaks, just as one would break a piece of crayon or a stick of candy. Glass cannot be broken so easily. It must be done properly or it doesn't break evenly, and improper breaking may result in cuts. Do not put much faith in glass; it acts queerly. It will act as you desire if you treat it according to its nature. Would you like to know how to treat it so that it always breaks as you want it to break?

Some such initiation to the method of the breaking of glass tubing results in a need for the skill, it produces in the learner a desire to acquire the skill, and it focuses attention upon the remaining factors involved in the motor skill.

2. *A clear percept of the needed skill.*—How can a pupil progress satisfactorily unless he has a clear picture of the end? The end, in this instance, is the percept of the glass tubing when it is properly broken and the processes to be followed in breaking it correctly. The teacher might proceed as follows:

> The glass tubing when well broken is round and even, there are no jagged points, there are no signs of cracks at the ends. To make the ideal break, file a small notch in the tubing, then clasp the tube with both hands, and put the points of the thumbs together below the notch and press downward and outward with the fingers, and upward with the thumbs, with an even pressure until the tubing snaps apart. (Teacher demonstrates.) The notch weakens the tubing, and the tubing breaks at the weakest spot, and breaks evenly. Be sure the thumbs are together, as shown in Figure 6, *A*, and not spread as shown in Figure 6, *B*, otherwise the pressure is not concentrated below the notch, and a poor break or a cut may result.

The percept of the processes involved in this skill is developed by demonstrations, graphic productions on the blackboard, and verbal explanations; all three means produce a better percept than one is likely to give. The graphic productions are used to enlarge or emphasize details not easily gained in the demonstration or in a verbal explanation. Verbal explanations during demonstration draw attention to the right sequence or to smaller details likely to be overlooked in observation. With the right percept clearly in mind, the pupil has an end in view which serves as a guide in his next steps in learning to break glass tubing.

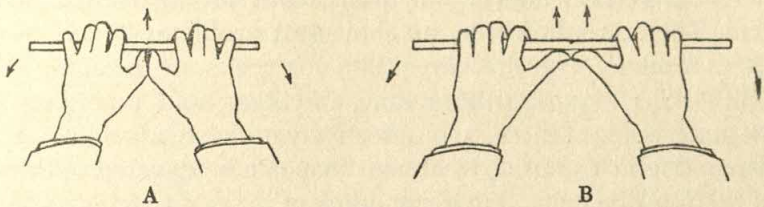


FIG. 6

3. *Correct initial performance.*—After the desire has been aroused and the percept has been developed in the pupil's mind, the third step brings in the initial attempt to perform the skill. During this step, right performance must take precedence over speed or hasty execution. Pupils, as a rule, are generally inclined to plunge in at full steam, forgetting and neglecting the essentials and niceties that often mean smooth and efficient execution in the future. In breaking tubing, some will file a notch so deep that one would think they intended to file the tubing apart; others will have the notch on the underside of the tubing in making the break; still others will hold the thumbs flat against the tubing. While pupils are trying, their mistakes should be detected, their difficulties analyzed, their oversights pointed out, and their percepts reinforced; but, no matter how slow the process, correct performance should not be sacrificed for hasty execution. Poor procedures may become so firmly established that they will carry over into the finished skill. An inefficient way of doing in the initial stage will result in an imperfect performance thereafter.

4. *Practice for speed of execution.*—When the correct initial performance has been completed, that is, when the performance is satisfactory with reference to the proper processes entering into the operation, there follows the last step in which performance is continued until it can be done at the desired or required rate of speed. In breaking glass tubing, there is no particular need for speed because the skill is not so important, or complex, or urgent; but many skills are efficiently performed only after hours and hours of practice extending over weeks and months.

The four steps in motor learning, although applied to a relatively simple skill, hold equally well in the learning of any motor skill. There are, however, psychological problems which confront teachers who are responsibe for the more complicated skills—skills requiring more time, direction, and precision in learning. Some of these, to be effectively understood and taught, demand more extensive treatment than can be devoted to them in this book on general understanding of teaching and learning.

Related principles.—A few general principles of directing motor learning are closely related to the steps thus far mentioned:

1. One of these principles is concerned with the learning of some motor skills which can be broken up into parts. Should the parts be learned by themselves first and then joined together into the complete skill afterward? Or should the skill be learned as a whole? As a general rule, skills not too involved should be learned as a whole. For example, in writing, it is not best to practice making a whole series of *n*'s, then *a*'s, followed by *t*'s, etc.; the whole word or words should be written. In complicated skills, such as learning to type or to swim, the skill cannot be learned as a whole but is broken up into parts. Even in such cases, however, the parts should be fitted together in practice so that they approximate more and more a higher stage and finally develop into the complete act; in other words, the parts must not become separate skills but should be welded together as soon as possible into a still higher division of the end in view until the end itself is attained.

2. Correct initial performance and practice for speed of execu-

tion should be carried on under conditions that are the same as the conditions under which the skill will be used in life. For example, writing as carried on in life is done with a pen or pencil; the material used to write upon is paper, ruled or unruled; there are no models to follow except the images in the mind; no one is around to guide the hand if it cannot make the letters. These conditions are the ones under which writing proceeds in actual life. At one time the groove board was used, a board with the capital and small letters perfectly grooved upon it, and the pupil took some pointed instrument and followed the grooves, thereby supposedly giving the muscles and fingers the feel of perfect letters; and after this exercise the pupil, it was thought, would be able to make good letters in actual writing with a pen or pencil upon paper. This practice was discontinued because it was inefficient, and it was inefficient because it did not give training in the way writing is carried out in real-life situations. If one is big enough, strong enough, and old enough to learn to ride a bicycle, then he should practice with a real bicycle. If one is mature enough to learn to swim, water is the medium in which to learn. This principle which stresses practice under conditions true to life is very important.

3. After the correct initial-performance stage has been completed and the pupil continues to practice for speed of execution, the question of the length and distribution of practice periods comes forth for consideration. No hard-and-fast specifications can be set down in answer to this question, because pupils vary and skills vary in their demands upon pupils; some skills require little exertion and little attention during practice, while others require much exertion and constant strain upon the muscles and mind. The gist of experimental evidence seems to indicate that, for learning most skills, daily practice periods from fifteen to thirty minutes in length, or two daily periods of the same length and properly distributed, give best results. The evidence, in short, shows that daily practice periods of the right length, distributed over a period of time (days, weeks, or months), produce better learning than long periods crowded into a short space of time. In seeking a reason for the evidence shown, one might

surmise that a pupil, after fifteen or thirty minutes of intense application, reaches a point where fatigue, interest, and strain lessen the intensity of the application. It is only when one is trying harder and harder that real improvement is made, not when one is dawdling and putting in time. Practice periods should be periods of intense activity, periods during which the learner is working up to his best; at the time in practice when he cannot keep up to his best, there should be a period of rest. It is better to strive for higher and higher levels through one's very best efforts than to remain on the same level or sink to lower levels through halfhearted and monotonous repetition. In general, the length of the periods should be determined in accordance with the principle of working up to the maximum while one is practicing, and the distribution should be one or two periods a day over a length of time sufficient to bring the skill to the degree of perfection needed.

Motor learning, in its higher phases, is to such a large extent confined to certain pupils pursuing particular lines of work that a more exhaustive treatment will not be undertaken. Teachers of industrial arts, physical education, commercial subjects, and fine arts should receive special help from instructors of these subjects or from authors who stress motor learning in its intensive and extensive applications.

APPLICATION EXERCISES

1. When making a right turn, why do many auto-drivers hit the curb with the hind wheel?
2. Explain the steps you would take in teaching a woman driver how to park a car along the curb when the space between two parked cars is just large enough to enable parking of another car.
3. Do percepts play important parts in motor learning? Give several illustrations.
4. In a final examination, questions were written on the blackboard. One question was: Explain what "Cotton Is King" means. One pupil interpreted the part in quotation marks to mean: Cottou Is King. He said that he didn't know the man. The teacher made her *n* look like a *u*. Analyze your own penmanship and determine its quality. Watch for the closed *e*'s, uncrossed *t*'s, *m*'s that look like *w*'s, *n*'s that resemble *u*'s, *cl*'s which look like *d*'s, spacing between letters, unevenness of letters, and the different slants of different letters.

5. Years ago there was considerable emphasis placed upon best methods in learning skills. The pencil was to be held in a certain position, the batter was to stand at the plate in a specified way, and the grip on the bat was to be just so. Although best methods are not now given so much consideration, there are still some best ways of learning skills. Are there best methods in typing? Positions while playing musical instruments? Explain why a cross-handed batter will never be a sure and powerful hitter in baseball.
6. Try pronouncing these words: methodically, chicanery, apparatus, data, debris, euchre, deaf, and San José. Are the four steps in learning a skill involved in developing the ability to pronounce a new word?

RELATED READINGS

COMMINS, W. D. *Principles of Educational Psychology,* chap. xii. New York: Ronald Press Co., 1937.

DAVIS, R. A. *Psychology of Learning,* chap. vi. New York: McGraw-Hill Book Co., 1935.

GATES, A. I., *et al. Educational Psychology,* chap. xi. 3d ed. New York: Macmillan Co., 1948.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* chap. ix. 2d ed. New York: American Book Co., 1947.

SKINNER, C. E., *et al. Elementary Educational Psychology,* pp. 211–17. New York: Prentice-Hall, Inc., 1945.

SECTION 4. THE PROBLEM-SOLVING TYPE OF LEARNING

Keeping in mind the objectives and the activities used in attaining them, attention will now be given to the nature of objectives requiring the problem-solving type of learning and the activities coming under this type.

An attempt has already been made to have the reader feel and experience in his own learning the nature of abilities acquired through problem-solving. Have you the ability at this time to change Fahrenheit degrees to centigrade degrees and vice versa without formulas as props? Can you find the sum of the degrees in the interior angles of any polygon? Do you know what Holmes meant by saying that you should leave your low-vaulted past and build a temple with a dome more vast which should shut you from heaven until you are free? If 162 is 135 per cent of a number, what is the number? Of course, you must be the judge in answering these questions; if you really compre-

hend, you will recall that sometime in the past you thought through these situations and your understanding of them became part of you. If now you revert to some memorized formula or try to juggle the words or figures to get answers, you probably did not understand them originally. How does it come about that some persons have real mastery of these situations while others do not? The answer is that there must have been a difference somewhere in the learning, and this difference, no doubt, could be found in the activities used when these situations were encountered. At any rate, when genuine understanding is an aim, the activities bringing about this understanding can best be classified as reasoning activities. On the contrary, if one's aim is to repeat words or to manipulate formulas mechanically, he can achieve these ends by rote or verbatim learning. What progress has one made, however, if real and lasting comprehension is the aim?

KINDS OF REASONING

During a lifetime one meets many problems which must be coped with in one way or another. One can dispose of a problem by accepting the solution worked out by someone else, or he can solve or attempt to solve it by his own efforts. The old geometry books usually gave the proofs for theorems and pupils memorized the proofs verbatim; in this way pupils "let George do it" while they worked slavishly to memorize the statements thought out by another. Perhaps a day will come when George will not be around to provide worked-out statements; then we shall find individuals in the throes of a severe mental depression unable to learn their way through when the problems and difficulties of life need to be overcome by straight thinking.

Inductive reasoning.—The author remembers vividly the showing made by superintendents, principals, and experienced teachers in his summer-school course in the supervision and improvement of instruction. A few simple problems in division of decimals were to be worked at the board by members of the class. Many of them failed dismally; they were trying to remem-

ber the rule for pointing-off, but they could not. The following problems are typical of the ones given:

$$.02\,\overline{|.5054} \qquad .5\,\overline{|3.505} \qquad .002\,\overline{|10.836}$$

In all probability these advanced students had performed activities in their previous study of division of decimals that did not lead to a genuine grasp, at least they were unable to meet the situation described. If understanding of division of decimals is an aim, let us follow through to discover what activities a person performs to secure understanding.

Now, $4 \div 2$ means that one determines how many 2's there are in 4; $1 \div \frac{1}{2}$ means that one determines how many halves there are in one, etc. In any whole thing there are two halves, three thirds, twenty twentieths, one hundred hundredths, etc.

How many .02's are there in one whole thing?
How many .5's are there in one whole thing?
How many .002's are there in one whole thing?
How many .04's are there in one whole thing?

There are fifty .02's in one whole thing, then, in about one-half (.5054) of a unit there must be about ½ of fifty or twenty-five .02's; therefore

$$\begin{array}{r} 25.27 \\ .02\,\overline{|.50\,54} \end{array}$$

demands that the decimal point in the quotient be placed between the 5 and the following 2. Likewise, there are two .5's in a whole thing, and in about 3½ units (3.505) there must be about 3½ times 2, or 7; then

$$\begin{array}{r} 7.01 \\ .5\,\overline{|3.5\,05} \end{array}$$

means that the decimal point must come so that the answer is about 7. Again, in one whole thing there are five hundred .002's, so in almost eleven units (10.836) there must be almost 11 times 500, or five thousand five hundred .002's; hence

$$\begin{array}{r} 5\,418. \\ .002\,\overline{|10.836} \end{array}$$

calls for an answer which must be approximately 5,500, so the decimal point is placed after the 8.

$$\begin{array}{r} 25.27 \\ .02\overline{)\,.50\ 54} \end{array} \qquad \begin{array}{r} 7.01 \\ .5\overline{)\,3.5\ 05} \end{array} \qquad \begin{array}{r} 5\ 418. \\ .002\overline{)\,10.836} \end{array}$$

Observe how pointing-off in the quotient seems to work out if the decimal point in the divisor is moved over to the extreme right and then the point in the dividend is moved over the same number of places, and the decimal point in the quotient is placed directly above the point in the dividend. A rule for pointing off may be formulated, but knowing why the point in the quotient is put in a certain place is all-important. One should always be able to divide decimals correctly even after long periods of time between uses of the principle. Where to place the decimal point in the answer can be rediscovered quickly if understanding is secure in the beginning.

Activities in learning such as illustrated are called reasoning processes; in the case cited the reasoning was inductive, meaning that specific cases or instances were considered and from them was found a general procedure to work problems in division of decimals. The procedure or principle is called a generalization. Finding the sum of the degrees in the interior angles of any polygon was reasoned out inductively for the greater part, and the rule or formula derived can be called a generalization.

Deductive reasoning.—By proving the following theorem (Fig. 7), the reader can test his knowledge of geometry:

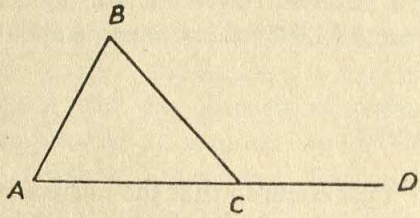


FIG. 7

THEOREM: The exterior angle of any triangle is equal to the sum of the two remote interior angles

Given triangle *ABC* and exterior angle *BCD* (Fig. 7)

CONCLUSION: Angle *BCD* = angle *A* + angle *B*

PROOF: Proof is left for you—do it now

If a person is able to prove this theorem, he is aware that information already known must be utilized in the reasoning process. It may be that, after searching his background of information, he

finds nothing there to help, and this is possible; if, however, the necessary knowledge is there and he does not find it or depends upon someone else to tell him what facts to use, he has not developed ability to think and to apply what he does know. Provided the individual does not readily see the relationships, a few suggestions may be helpful. Upward from point *C* construct a line parallel to line *AB;* when two parallel lines are cut by a third line, certain pairs of angles are equal; some of these pairs should help in proving that the exterior angle BCD = angle A + angle B. Deductive reasoning is the kind of reasoning one does when he searches his experiential background to see if there are some known ideas which will help in solving a particular situation, in this case that the exterior angle of a triangle equals the sum of the two remote interior angles.

The two kinds of reasoning complementary.—Reasoning activities in school or anywhere lead to (1) the acquiring of ideas and concepts and to (2) the application of ideas and concepts to new situations. Whether it be the acquiring or the applying of ideas, the activities fall under the reasoning type of learning. The following testimony of a college Freshman illustrates the complementary nature of the two kinds of reasoning:

> Vividly do I recall the things that happened to me when my teacher had me learn the parts of speech. She told me to memorize them, that is, to repeat the definitions in the grammar book. When class time came, I couldn't give the definitions, others in the class couldn't, so the teacher kept us after school. In spite of forty minutes' study we could not get more than three or four parts at most memorized before the other parts slipped away into space, and, when tears and darkness came simultaneously, we were dismissed with a warning to take our books home and never come to class again with such a poor lesson.

The memory activities have a place, but they are not the sound ones to set in motion when development is at stake. In learning the parts of speech, inductive reasoning should have been used in building up generalizations, and the generalizations in this case were the definitions; on the contrary, the Freshman attempted to memorize the generalizations (definitions) without knowing the meaning of what he was memorizing. As soon as

this person tried to determine what part of speech a word in a sentence was or should be, he began to reason deductively.

Many valuable ends of learning are derived by making correct applications of what is already in the background of knowledge; in other words, by using deductive reasoning activities. For example, let us suppose one knows that the object of a preposition is in the objective case. This knowledge is either learned outright, taken for granted and memorized, or it is learned by inductive reasoning; at any rate, we shall say that a person who knows that rule has acquired a valuable bit of knowledge. On the other hand, the same person might speak in this fashion: "Gentlemen, I have been invited to speak to you tonight, but between you and I, this speaking in public is no dessert for a timid soul." Which should be valued more highly, (1) the knowing of a rule or (2) the knowing and the correct application of a rule? If the individual making the mistake tries to correct it, he will either (1) memorize "between you and me" or (2) he will start mental activities which run as follows: "What pronoun should I use in such a construction? I know that the object of a preposition must be in the objective case; yes, *between* is a preposition and it has two objects, *you* and *I* (or *me*), but I should use *me* because *me* is the objective case form and *I* is the nominative case form. Hereafter I shall watch my case forms more closely and not make any more errors in public." If this person followed the latter procedure, he used deductive reasoning because he solved a particular problem by applying correctly a rule that he already knew.

Without hesitation we can say that the deriving and the applying activities are both involved in learning, meaning that inductive and deductive reasoning are both employed. There is no advantage in making a sharp distinction between the two; if a teacher realizes fully the characteristic nature of her aims, she will direct learning so that the necessary activities, be they inductive or deductive or both, will be set in motion. On the other hand, if a teacher is not concerned with understanding, insight, application, and development of a pupil's traits and powers, but is satisfied with mere repetition of words, she will surely revert

to rote memorizing activities in guiding learning. Unless a teacher is interested in the nature of her objectives, she cannot be expected to concern herself deeply and seriously with the activities underlying the attainment of them.

The activities in problem-solving are those which lead to maximum self-discovery through maximum individual effort. The word "maximum" is inserted to signify that a teacher should assist pupils in various ways and at different times, yet she should not do so much herself that the activity of pupils dwindles into mere passive memorization of the ideas and thoughts of another. The director of learning should stimulate and secure the largest amount of self-discovery of ideas through individual pupil effort.

Reasoning and nonreasoning activities.—At this time it is necessary to see clearly the activities in learning which are really problem-solving in nature and those which are merely the absorption or the retention of another's ideas. Often the latter are mistaken for reasoning, whereas in reality they are processes falling under another type of learning, usually under memory. In a text before me, under the heading of problem-teaching, are problems including these: "How did this country come to be discovered? How were the colonies settled? How did the people live? What is the story of the tariff? What is the history of our present constitution?" "How do the Chinese live?" may be called a problem; and, if one reads a few chapters in a book and then is able to tell about crowded conditions, how Chinese eat with chopsticks, raise rice, and live in canal boats or bamboo huts, how much problem-solving has been done? Well, in all seriousness, probably not one activity of a problem-solving character was performed. Partaking of information prepared by another is, after all, accomplished by reading and remembering what is read. It is desirable that one should know much about the Chinese, but let us not be confused over the activities employed; if these activities are not reasoning ones, they should not be so called. Suppose you go into a classroom and the teacher says, "We have just finished our problem: 'What is the history of our present constitution?' " are you sure that thinking was done in the so-called problem? Ask the pupils, "What did the men at the convention do

about the number of senators from each state?" and every hand goes up. "Mary, you tell us." Mary says, "There was a compromise, and it was settled by having two from each state." As yet you are not sure that Mary or any of the other pupils reasoned, because the fact is boldly stated in the textbook. They can read. Ask, "Which states stood out for the same number from each state?" Merely three hands go up this time, and the answers are New York, Virginia, and Massachusetts. Guessing is in progress, these states have been encountered more frequently in reading. Tell them that the books says the small states held out for two senators. Then ask, "Why should the small states insist that there be two from each state?" This time there is not a hand up; the faces are almost blank. These pupils do well in remembering textbook materials, but reading a textbook is not problem-solving. The answer to the last question is not in the textbook. These pupils do not know the answer. A situation requiring reasoning is at hand; an opportunity for self-discovery through individual effort is afforded. At this point problem-solving activities must be used; there is no alternative.

Dewey's words at this time are germane:

> We may recapitulate by saying that the origin of thinking is some perplexity, confusion, or doubt. Thinking is not a case of spontaneous combustion; it does not occur just on "general principles." There is something specific which occasions and evokes it. General appeals to a child (or to a grown-up) to think, irrespective of the existence in his own experience of some difficulty that troubles him and disturbs his equilibrium, are as futile as advice to lift himself by his boot straps.[5]

Practically all the problem-solving done in secondary schools is prompted by specific perplexities arising in connection with study from day to day. Merely giving a problem title to a topic is not a guaranty that reasoning will be involved; naming never cures. That activity which goes on within the problem or unit determines the character of the learning. Perplexities pull reasoning into operation; other circumstances pull upon memory, sensory experience, muscular action, and emotional learning. When one starts out to study a big topic or unit, he builds up his

[5] John Dewey, *How We Think* (New York: D. C. Heath & Co., 1910), p. 12.

structure of learning little by little; and then the accumulation of facts, skills, ideas, and ideals, gained by several or all of the types of learning, enters into the understanding of the problem or unit.

Coming back to our history class and the compromise, there is a specific difficulty, and the solution of that difficulty fits into the understanding and development of the unit; in brief, the solution brings out a valuable contribution in the form of more ideas. But who sets the perplexity, who sets the condition bringing about the need or necessity for reasoning? Surely, in this case, the pupils did not. The moral is clear: The great majority of opportunities for reasoning are provided by the teacher. It is a teacher's duty to initiate and provide situations which require pupils to reason for themselves. Indeed, good teaching is entitled to the name *good* because it does provide for good aims and good procedures in study, and among the procedures should be found those which promote self-discovery through maximum individual effort.

OPPORTUNITIES IN TEACHING TO PROMOTE REASONING

A teacher who is alert is constantly watching for problem-solving opportunities to present to her pupils, problems that, when worked, will bring forth ideas as well as greater skill in reasoning. In the assignment, in questioning, during class discussion, in developmental procedures, in introducing new work, in arranging laboratory experiments, there are abundant opportunities. The author knows a teacher of physics who does not believe in letting pupils follow mechanically a manual in performing experiments in the laboratory, neither does she believe in telling pupils minutely what to do; she sets the problem, and each pupil must plan his experiment before he goes to the laboratory. Let us witness the procedure:

THE PROBLEM: How can the volume of irregular pieces of unknown metals be determined experimentally?

JOHN'S PLAN: Weigh the pieces of metal accurately. Using the table of densities in the text, find out the density of one cubic centimeter of iron. Divide the weights of the irregular pieces by the weight of one cubic centimeter. The answer will be the volumes of the different pieces.

TEACHER (in conference with pupil): "John, I am not sure your plan will

work. Can you see any reason why your plan may not be correct?" (John thinks but cannot discover why it will not be right.) "John, how do you know that I'm going to give you irregular pieces of iron? Does the problem state that the pieces are to be iron?" John admits this. "Now, your plan must be accurate regardless of the metal used, even I do not know what is in the pieces of metal I am going to give you. I only know there will be metal in them, probably a mixture of several metals. You better try again."

JOHN'S NEW PLAN (after twenty minutes): Weigh each piece of metal accurately. Find the weight of each piece when it is under water. The difference between the weight in air and the weight under water will be the volume. Using Archimedes' principle: a body under water is buoyed up by a force equal to the weight of the liquid displaced, the difference in weight in grams will be equal to the volume of the piece of metal because one cubic centimeter of water weighs one gram.

TEACHER: "Will your plan work regardless of the kind or kinds of metal in the pieces?"

JOHN: "Yes, I figured that out carefully. It will work because the piece will displace just so much water whether the piece is heavy or light metal. It is not necessary to know the kind or kinds of metal at all. I see that now."

TEACHER: "Very well, John, take these three pieces and see if you can get the same volumes that the company experts say each piece should have. We will compare answers when you have finished."

Problems are often found in the perplexities that pupils themselves encounter in their experiences. Let us sit in on this science class discussion:

ANDREW: Just last week I had a peculiar thing happen to me. I took mother over to Oregon [a village twelve miles away] to see a friend of hers who was ill. A few days afterward, we went again, but the second time we went the car seemed to bounce all over the road and the riding was rough. I've oftened wondered what made the difference, and so has mother.

TEACHER: Andrew, that is hard to explain. Probably the class could help you.

SUSIE (*a pupil who always has a quick answer*): I think Andrew just imagined the riding was rougher on the second trip. Sometimes we imagine that water is hot, especially when we have cold hands and put them into water which is only warm, but we think the water is hot because the hands are cold.

ANDREW: Well, mother noticed the second trip was rougher, too, and both of us couldn't be mistaken.

HARRY: Probably a different road was taken to go to Oregon on the second trip. If the roads were not the same, the road taken on the second trip might have been an old road and rougher.

ANDREW: No, we went the same way both times.

FLORENCE: Perhaps Andrew drove faster the second time. In fast driving

you hit the rough spots with more force and bounce higher. It's just like kicking a football; if you kick harder, the ball will go higher.

ANDREW: No, mother won't let me drive faster than thirty-five miles an hour when she's with me. I would drive faster with dad. I watched the speedometer and kept it at thirty-five on both trips. Mother watched it, too.

FRED: Andrew, did you pump up the tires before you took the second trip? If you pumped them up before you took the second trip, they would have had higher pressure than they had on the first trip and the car would bounce more. In playing basketball, I've found out that the ball bounces better just after it's pumped up solid.

ANDREW: No, I pumped up the tires to forty pounds at the gas station just before we took the first trip, and I almost froze my fingers doing it.

MAUD: Since tires leak a little, they would be softer before the second trip, probably a pound or two. The riding should then be better the second time, but it wasn't, so this can't be the reason.

(At this point pupils were at a loss to proceed. One boy suggested that they give it up as impossible. Susie again advanced her explanation that it was only imagination.)

TEACHER: There must be a reason. In science every phenomenon has its cause or causes. Not long ago we had a certain demonstration which you observed. Remember the one in which cold water was poured for some time over a tin container, then the cork was firmly pushed into the top, and quite soon afterward that cork flew out with a loud noise when the tin container was placed over a bunsen burner. Do not speak out, but think about this, it may help you in explaining Andrew's difficulty. When you have an explanation, just indicate by raising your hand.

WILLIAM: May I ask Andrew a question?

TEACHER: Certainly.

WILLIAM: Andrew, do you remember whether the day you made the second trip was warm or cold? The day the first trip was made was cold, I know, because you nearly froze your fingers pumping the tires.

ANDREW: The day we made the second trip was warm, very warm. We had the windows wide open, and still we were comfortable.

SUSIE (*eagerly*): I believe I have the answer.

TEACHER: William seems to have an explanation, too. William, would you mind if Susie gave her reason first?

WILLIAM: No.

TEACHER: How many in class have a reason? (Many pupils indicate that they have.) Well, Susie, what is your answer?

SUSIE: The day Andrew made the second trip was warm, and the air in the tires expanded, making the tires hard; then when these tires struck holes or rough spots in the road, they made the car bounce around a lot.

TEACHER: William, what is your idea?

WILLIAM: I had the same one.

TEACHER: How many others had that reason? (Many indications.) Yes, that seems to be the correct reason. Susie must be complimented for changing her opinion. It is always better to keep thinking, and then change

one's opinion when new evidence is seen or discovered. First notions are not always correct.

HARRY: May I make a suggestion?

TEACHER: Surely.

HARRY: I suggest that Andrew watch the pressure in his automobile tires if he wants his car to ride the same from day to day.

TEACHER: That suggestion would be profitable to all car-owners. Andrew, I am sure that the class and I would be pleased if you check up on the reason given to see if it is correct. How could Andrew verify our explanation?

ANDREW: I know. Some cold day I could measure the pressure and then measure it again on a warm day soon afterward, to see what difference there was. I might even drive the car to see if it bounces.

TEACHER: Yes, we would surely appreciate that. It would be interesting to get reports from any of the boys who drive cars.

VALUES DERIVED FROM REASONING

There should be brought up for comparison now the activities carried on in rote memorizing and those utilized in reasoning. Can memorized words produce the understanding, the retention, and the power of application brought about by problem-solving? Can you feel in your own learning the difference between actually solving a problem and memorizing a rule or formula that can be used to get an answer to a problem? Which seems to leave you master of the situation and which seems to leave you feeling shaky and uncertain? In which case do you feel that you have really learned and have not deceived yourself? In which case do you feel that retention will be long and probably everlasting? In which case do you feel that you have grown stronger and more independent?

In following through the treatment of problem-solving activities thus far, you have begun to experience the differences between these activities and the activities in other types of learning. You realize, first, that a teacher must be conscious of the results she wishes to bring about. Second, you realize that the learning activities have a significant bearing upon the results. There are two groups of objectives a teacher should have in mind when problem-solving activities are brought into operation: (1) knowledge and (2) personal attributes. Of course, not all the personal attributes will be striven for; but *thinking* and others

closely related to thinking, such as *suspended judgment, critical attitude,* and *analytical keenness,* will be singled out and striven for directly. While the latter are being developed, they might just as well be exercised upon useful materials, thereby bringing both useful knowledge and reasoning attributes simultaneously.

Values conditioned by teaching.—In the following quotation, Book stresses thinking and the conditions supporting thinking:

WHY MANY CHILDREN FAIL TO LEARN TO THINK

The school as organized today makes the exercise of the thinking functions difficult and often impossible. Too much emphasis is placed on the impression, too little on securing the right kind of activity from pupils. Learners are not, as a rule, given an opportunity to do things for themselves. They are told, or made to feel, that their opinions are worthless; that they should follow, not lead; listen and remember, not work things out for themselves. Teachers have insufficient knowledge concerning the learning process and concerning child nature. This prevents them from giving the type of direction needed to make their pupils learn how to think. The problems assigned are too often ill adapted to the child's capacities and experiences. To give the needed help, the child's power to think must be known, and it must be fully utilized at every stage of his development. The frequency with which he tries to think and the quality of his thinking must also be known, and work must be assigned and directions given that are definitely planned to overcome these deficiencies. Unless these conditions are arranged and maintained, pupils will not learn how to think accurately and constructively while performing their regular school tasks.

SOME PRACTICAL SUGGESTIONS FOR TRAINING CHILDREN TO THINK

The following lines of training should prove helpful and should be arranged by teachers and parents as far as possible:

1. The teacher should see that his pupils meet problems that are well adapted to their ability, to their training and experiences, as well as to their present motivation and ability to succeed.

2. He should refrain from doing too much for his students. Otherwise the learning process will not be reversed, inasmuch as this higher type of thought activity will not be indulged in.

3. Teachers and parents should answer carefully and sympathetically every question asked by a child, and in a way that will stimulate further thinking rather than make thinking unnecessary. They should also refrain from discouraging thought by making light of any question asked or by leaving the impression that they regard his questions as of little significance. A question that seems ridiculous or useless to an adult may be very significant for a child.

4. Children must be allowed to investigate things for themselves and encouraged to do so.

5. All instruction must be arranged to stimulate learners to get many facts, since these perceptual experiences provide the materials that are used in solving future problems.

6. All learners must be directed in a way that will make the problem to be worked upon definite and clear.

7. Suggestions must be made that will aid learners to systematize their ideas and extend their relationships by making a variety of responses to every important experience or fact.

8. Special attention must be given to checking the learner's thoughts and work. Without this verification their thinking will not be relevant to the problem in hand.

9. Learners must be trained to analyze their problems, so that the more significant parts of a situation can be selected, properly evaluated, and reacted to.

10. Learners must be gradually led to test the results of their thinking for themselves. They should establish the habit of supporting each important conclusion by stating explicitly the facts and premises from which it has been drawn.

11. The problem assigned must be of interest to the learner. Otherwise no progress will be made in learning how to think.

12. Teachers should remember that the results obtained by their pupils may seem trivial and yet be very significant for developing effective habits of thinking and work in the learners. This is especially true in learning how to think or reason about a thing with which the learner may have had very little experience, or concerning which his information is too inaccurate to reach conclusions that might easily be reached by an adult.[6]

Development of personal attributes a real value.—At this time the reader should discover in his own study the importance of growth in personal attributes as an aim in teaching. Growth in personal attributes does not come without nourishment; it, too, must be nourished by appropriate opportunities, and problem-solving opportunities are especially potent in fostering growth of certain of these attributes. We admire persons who are able to do things themselves, persons who are self-reliant and self-confident. Self-confidence cannot grow in an environment of spoon-feeding; it develops when an individual's best effort is put forth to meet and successfully master the work. The closest parallel to this situation, in school, is the facing and conquering of real and

[6] W. F. Book, *Economy and Technique of Learning* (New York: D. C. Heath & Co., 1932), pp. 297–99.

worth-while problems. Suspending judgment until all the evidence has been brought to bear upon the problem is another process of growth, a personal trait that we like to see in human conduct. Avoidance of prejudice is likewise a manifestation of desirable mental behavior. We like to see a person who weighs the evidence, one who is somewhat critical, one who does not believe everything he reads or hears. But, again, a critical attitude is developed; it does not come into existence from nowhere. These attributes, and similar ones, should be directly taught, or sought for, in school; they cannot be achieved by pupils through admonitions from a teacher, regardless of the teacher's seriousness or good intentions. They come from learning activities calling for the exercise of these attributes in connection with actual problems. Indeed, so important are these attributes that the literature on teaching abounds with expressions such as these: "Not the learning of texts, but the solving of problems is the desideratum"; "Honest thinking the goal"; "One of the chief aims of science teaching should be to train pupils to use the scientific method in the solution of all their problems"; "The chief aim of education is to teach pupils to think, not to make their minds cold-storage plants"; "Unless we train our young people to think, our democracy cannot endure." With this aim of education crying for a full and deep development, a teacher cannot rest easy or contented with the soft "hearing of lessons" as the whole of teaching. This country needs great souls in the teaching profession—teachers with vision, understanding, insight, inspiration, and devotion, teachers who see the values and who can direct minds into ways of deriving them. And among the greatest of these is ability to gain knowledge and reasoning attributes through self-discovery and individual effort.

APPLICATION EXERCISES

1. A piece of ice is put into a glass and then water is poured into the glass until the level of the water is even with the top of the glass. When the ice melts, will water run over the edge, will the level of the water be lower, or will the level remain the same? How much guessing will some persons do in figuring out the answer? Is some scientific information needed to find the correct answer?

2. Columbus had no proved facts to show that the world was round, yet he was convinced that it was round. What led to his strong conviction?
3. Should married women be permitted to teach? Ask several persons this question and keep a record of the reasons given for the conclusions drawn. Are conclusions based upon fact, opinion, prejudice, experience, or personal convenience?
4. Why is the divisor in division of fractions inverted? Figure out the reason and then analyze the mental processes used.
5. What is a fallacy in reasoning? Give several illustrations.
6. Investigation shows that pupils in high school who take "stiff" courses, such as Latin, mathematics, and science are better reasoners on the average than pupil who take the "snap" courses. If good thinkers are wanted, then pupils should be required to take the difficult subjects. What do you think?
7. Teachers often say to pupils, "Think!" What is the best way to secure thinking on the part of pupils?
8. Today much emphasis is placed upon problem-solving as contrasted with memorization in classroom learning. What brought about this shift?
9. The physics class had been studying pressure in liquids which included Archimedes' principle. The teacher asked, "When one is bathing, the stones on the shore always hurt the feet more than the stones out where the water is four or five feet deep. Who can explain?" A pupil replied, "That's because the stones on the shore are sharper." Other class members laughed. Why?
10. In spite of all a teacher can do, some pupils will think deeper and faster than other class members. Enumerate a number of factors responsible for this difference in ability to think.

RELATED READINGS

DEWEY, JOHN. *How We Think*, chaps. iii–vii. New York: D. C. Heath & Co., 1910.

FREDERICK, R. W.; RAGSDALE, C. E.; and SALISBURY, RACHEL. *Directing Learning*, chap. xxiv. New York: D. Appleton–Century Co., 1938.

GATES. A. I., *et al. Educational Psychology*, chap. xiv. 3d ed. New York: Macmillan Co., 1948.

LANCELOT, W. H. *Permanent Learning*, chaps. viii–ix and xiii–xiv. New York: John Wiley & Sons, Inc., 1944.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools*, chap. xx. 2d ed. New York: American Book Co., 1947.

SKINNER, C. E., *et al. Elementary Educational Psychology*, chap. xii. New York: Prentice-Hall, Inc., 1945.

SECTION 5. THE EMOTIONAL TYPE OF LEARNING

Mary had completed her commercial course in high school with good grades; her diploma was given to her on commencement night as a token of work satisfactorily completed; she was

prepared and ready to go forth as a competent secretary or bookkeeper for some firm. A brief period after commencement, Mary did obtain a good position; after a short period of employment, she was called into the executive's office and was spoken to as follows:

> I am very sorry to tell you that we will have to dispense with your services at the end of this month. We have tried to help you become efficient and to fit into our organization. But, in spite of our suggestions, you still persist in practices to the contrary. I am sorry we must let you go, but our business interests must be safeguarded.

Mary had her diploma, but she lacked something of vital concern in her life. No suggestions of her employer were heeded; she insisted on having her own way; time after time she came late and departed early; on one or two occasions she argued feverishly; nothing was very neatly done; her convenience came first, the convenience of others later or not at all.

Another experience, related by a high-school teacher, is cited:

> I remember well, when I was in the elementary school, how the poem "The Night Has a Thousand Eyes" won its way into my list of treasured poems.
>
> The night has a thousand eyes,
> And the day but one;
> Yet the light of the bright world dies
> With the dying sun.
>
> The mind has a thousand eyes,
> And the heart but one;
> Yet the light of a whole life dies
> When love is done.
>
> With the aid of the teacher we were led to discover what the thousand eyes of the night were; what the dying sun meant in the daily run of things; what the thousand eyes of the mind and the one of the heart were; but what a feeling came when the last two lines were experienced and lived! In that same room with the poem was a little girl who received from me the deepest devotion of my childhood heart; it was she who made my attendance record almost perfect; it was she who made the schoolroom more pleasant and appealing; it was her absence which brought gloom and longing and darkness when the cold or the rain kept her from school. And my young mind began to realize what her loss would mean to me if she were no longer there. Surely, the light would go out, darkness would come. Indeed:
>
> The light of a whole life dies
> When love is done.
>
> And this selection won its way into my list of treasured poems.

CONDUCT AND APPRECIATION ATTRIBUTES

Behind these two illustrations lies a broad and deeply hidden background of meanings and possibilities and potentialities exceedingly important in the work of any teacher.

Conduct attributes.—First, there are implications relative to the aims of living and learning to live. Not all the real aims of living can be included in the one aim of making a living. Learning to live and learning how to make a living are two parts of complete living; the latter is never complete in itself, yet it is often the one part receiving all the attention. In the case of Mary we see a lack of personal attributes, and this lack of personal attributes was directly responsible for her inability to do well in a life-situation. In her case such attributes as tolerance, punctuality, neatness, loyalty, self-control, and politeness were underdeveloped or not developed at all. As a result she acted in a certain manner; or, differently stated, this lack of attributes influenced her conduct in an undesirable way. In short, she did not conduct herself properly. Her ability to type, to take notes in shorthand, and to do bookkeeping was not enough. Among other personal attributes influencing a person's conduct are: honesty, fair play, truthfulness, patriotism, broad-mindedness, dependability, thrift, kindness, and self-reliance.

Often personal attributes are called tastes, attitudes, or ideals; for example, we say that one has simple tastes in dress or decoration, that one who obtains and weighs the evidence has a critical attitude, that one has an ideal of honesty. Our concern here is to see that, whatever these attributes are called, they have an influence upon one's conduct. The honest person will act in one way, the dishonest person will act in another way. If we were not concerned with the conduct of pupils, we would not bother with the development of attributes; but, since conduct plays such a significant part in life, the development of attributes will always be vital in teaching.

Appreciation attributes.—Turning now to the poem, there is found a deep implication for the learning of pupils in high schools —in all schools. One need not be troubled about the term applied to the change which takes place in a person when he adds to his

treasured list of poems, but the addition of something worthy of treasuring should concern us deeply. No one can, however, add to his treasured belongings unless he feels a deep worth, unless he appreciates, unless he enjoys. A person who appreciates differs from the person who does not appreciate; the former has changed personally or has acquired an attribute that the latter has not. For purpose of clarity, these attributes will be called "appreciations." They, too, are attributes to be held vital in learning. These appreciation attributes are numerous, some of them being appreciations of poetry, literature, art, music, song, science, history, nature, beauty, and human nature. These appreciations determine how one enjoys his leisure, how he selects his hobbies, how he uses his physical and mental energies in moments of recreation or leisure.

In recent years much emphasis has been placed upon the worthwhileness of personal attributes as aims in secondary education, and rightly so. What shall it profit society to spend hundreds of dollars in giving a boy business training and then discover that the boy uses his education to exploit his fellow-citizens? Why stress everlastingly skills and knowledge without considering at all the manner in which these shall function for the good of the individual and society? Why give an individual power through learning without paying some attention to the building-up of the character from which this power emanates? Surely, the development of good citizens, strong and upright and noble characters, is a vital obligation of education. Simultaneously should the personal attributes be fostered with all the other objectives of learning. No chain is stronger than its weakest link; the chain of learning should have no weak links; the chain should not be weakened by the links of emotional learning. Teachers need to be more concerned with the personal development of young adolescents, everlastingly and untiringly concerned.

THE DEVELOPMENT OF ATTRIBUTES

A significant difference exists between the way personal attributes and other objectives are attained. A complete awareness of this difference will enable one to select the psychologically

sound activities in this type of learning. An analysis of your own learning will help you to experience this difference. We will start with the assumption that you have one personal attribute truly and thoroughly inculcated, the attribute of fair play. As you are walking along the street, you see a big, husky boy deliberately and unmercifully mistreating a small boy; the big boy kicks the small boy, takes him by the neck and thrusts his head into the snow, shoves snow down his collar, plugs his ears and eyes with snow, and then keeps holding him down in the snow. Do you see this and walk on undisturbed? You do not. If you are a man, your hair rises, and you intercede for the small boy in no mistakable terms; if you are a lady, you do likewise or you shout at the big boy to stop, you call for help, or you sympathize with the small boy. In any case, you are affected, something happens within that makes you feel like fighting. You have an emotional reaction of some kind; your ideal of fair play is violated, and you cannot remain unconcerned and undisturbed. Something happens within you, something that makes you stand by and defend your ideal. Somehow or somewhere you have learned to treasure fair play. How you gained that personal attribute is important.

Beginning with the part you know best, that you have this personal attribute, it will be best to trace backward through its development. You learned to believe in and stand for fair play just as you learned to spell, write, or figure; yes, you learned fair play, but different activities were utilized. The chart on the following page will assist you in tracing backward the activities employed.

In directing the learning of pupils to develop personal attributes, either to influence their conduct or their appreciation, the teacher will follow the reverse order, as indicated in the preceding chart. Figure 8 shows this growth.

It must be admitted that the emotional type of learning is the most difficult to direct, vastly more difficult than the sensory experience, memory, motor, or problem-solving types. It can be determined quite definitely what should be done to direct pupils to acquire motor skills or to understand geometry problems; it is

quite easy to discover if these have been sufficiently learned; it is relatively easy to discover if pupils can and will use these in their lives. But not so with personal attributes! The greatest weaknesses in teaching are found under this more human side of education. Why should this be true? There are several reasons: (1) the type of learning is least understood; (2) it is inherently diffi-

SEQUENCE OF STAGES IN ANALYSIS

4	3	2	1
The idea of fair play dawned upon you. You heard about, read about, or saw it. You became conscious of it in your living. You thought about it. You recalled situations involving fair play; there really was such a thing in living with others.	You began to feel that fair play was right; your best friends played fair. You were sorry once when you did use dishonest means to win; you were angry when another won from you by foul means. You felt that you would be fair; you resolved to be.	You practiced fair play; fair play became a rule in your conduct with others and others with you. Each exercise of fair play made you a stronger believer. You felt more deeply its value.	You interfere when fair play is violated. You play fair yourself, and you want to see fair play in all human relationships.
1	2	3	4

SEQUENCE OF STAGES IN TEACHING

cult; and (3) teachers teach for personal attributes just as they teach for facts and information, namely, by the hammering-in process. Of these three, the third accounts for most of the weaknesses in teaching for attributes because it includes the other two indirectly.

Stages in development of attributes.—The teacher can best succeed in directing emotional learning by knowing the successive stages through which pupils pass in gaining genuine conduct or appreciation attributes and by providing opportunities which bring out the activities in learning appropriate during each stage.

(1) *First stage.*—The foundation or beginning stage is that one

in which an idea is gained. There must be a beginning-point in all learning, and in emotional learning that beginning-point is an idea. When the linking of the words in the poem with the little girl in the schoolroom occurred, an idea was found or born; this linking was real, true to life, true to experience; it was concrete, it joined the poem with a dear reality in life. The idea was there, tangible, and worth while. No amount of talking or forcing or moralizing can make one form an idea; another person can sug-

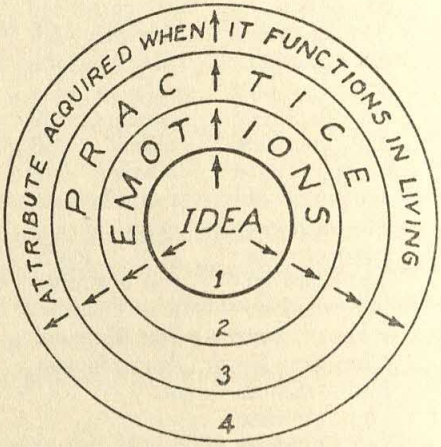


Fig. 8

gest and facilitate, but he cannot force one to form an idea. The idea that really counts comes from within, from actual experience or reconstructed experience.

Ideas come to pupils from a number of different sources, but the manner in which these come to pupils, from the standpoint of teaching, takes two general courses. In facilitating the formation of ideas by pupils, the teacher can employ the direct or the indirect approach. If the idea is brought out directly, that is, taught for by openly treating the particular conduct or appreciation attribute, the teaching is called direct. On the other hand, if the opportunity to gain the idea is provided without openly mentioning or stressing the attribute, the teaching is indirect. The following incident will show how David obtained an idea which started the development of a desirable attribute in his character:

TEACHER: Good morning, David. We missed you during the last few days, but we are glad you are back. Were you ill?

DAVID: Yes, I was, Miss Brown. I had a bad cold and I coughed a good deal. A few days ago when we were studying about diseases and how diseases spread, we learned that colds could be spread by germs coughed or sneezed into the air, and we learned that people without colds catch colds by being around where there are persons who have colds. When I was in a school in the country once, there was a family that had chicken pox. When school opened that fall, all the children in that family came to school, and nobody stopped them. Well, in a short time I had a bad ache in the back of my head, and in a few days I had chicken pox. I was quite sick for a while. Even today I have a few scars on my face from that disease. When I had this cold, I thought I might give it to somebody else if I came to school. I thought about the way I got chicken pox, so I told mother it wasn't right for me to give others a cold by going to school. Mother said I could stay home.

TEACHER: David, you did the right thing. I will do everything I can to help you catch up with the class.

David's idea was acquired indirectly; it was his idea; it was discovered without the aid of another person. At this time it is important to note not only the idea but also the essence of the idea. The idea was right out of the heart and soul of David, direct from his experience and life, connected with a sadness in his past, joined with his scars caused by the negligence of others, linked with the conduct of persons who violated his principles of human relationships. Indeed, it is such ideas as these that strike home and start pupils on the journey to indelible conduct and appreciation attributes. Sometimes these kinds of ideas come from indirect teaching, at other times by direct facilitation, but come these ideas must. Without the background of pupils' experience, feeling, insight, judgment, and sense of value, the ideas never take hold. Abstract discussions mean little or nothing, they are generally unheeded and seldom understood; but an idea from within carries weight and gripping significance.

At times direct facilitation of ideas is necessary and effective. No good mother allows her child to be dishonest; from the very first she tries by direct teaching to have her child see the value and need of being honest. So in secondary teaching, many ideas leading to attribute formations are taught directly. Basic, however, in direct teaching as well as in indirect, is to secure ideas

with the maximum amount of pupil reaction, concern, and significance. Too often teachers preach and moralize and eulogize in order to stamp in the ideas sanctioned by model adults; pupils listen, but they do not enter actively into the situations described. In direct teaching, a teacher must remember that she plays the part of a stimulator of ideas, not a drillmaster of ideas; she leads, but she cannot drive; she can ask questions or set situations, but the actual acceptance of the ideas comes from within the pupil. If they cannot, or are not disposed to, accept ideas, no outside force can make them do so.

(2) *Second stage.*—In the second stage some warmth, some feeling, some grip, or some emotional arousal connected with the attribute is essential. The source of this arousal is within the pupil; the source in turn is his experiences, his sense of values, his notions of right and wrong, his personal relationships, his connection with his world of ideas and ideals; the arousal gains momentum only as the attribute desired for him is associated with the many potentialities at the source. The source, then, of a pupil's learning in this type is always himself; his standards are of himself, his evaluations are evaluations of self, his notions of right and wrong are notions connected with himself. Failure in his learning comes when outside forces are employed to force the attribute into him without regard for the acceptant spirit within.

How can a teacher secure this inner emotional reaction? One principle seems to hold good in such reaction, namely: the emotional reaction must be within the reacting possibilities of the pupil. Emotional reactions cannot be expected to extend to the outermost limits; the range is determined by the background possibilities. One would not expect a high-school pupil to do the same amount and kind of physical labor as a healthy and robust adult, neither should one expect a young person to arouse his emotional reactions to the same degree or extend them to the same situations as does an adult.

Since the emotional reaction does not occur without a stimulus, the nature of the stimulus demands consideration. This stimulus is an idea associated with some personal experience. Examine again the nature of the stimuli in the appreciation of the poem

and in David's conduct when he was ill. In both instances an idea was the stimulus, the starting-point. Notice, further, that the ideas were not merely ideas, factual and cold in nature; these ideas were warm and touching and concerning; they related to the experiences and lives of the two persons; they aroused the response machinery driven by the emotions. The ideas and the emotional accompaniments were combined.

(3) *Third stage.*—Bearing in mind that conduct and appreciation attributes are learned, pupils should be given opportunities to practice, develop, and apply the mental and emotional learning initiated under stages (1) and (2). Any person who examines his own learning of attributes will discover that practice played a large part in bringing the attributes, little by little, to complete development. By complete development is meant that the attributes functioned in everyday living. When David decided to stay out of school because he was concerned about spreading germs in the classroom, he actually practiced, and that practice made him stronger in conduct. All too often learning of attributes stops with good intentions; it should continue until it functions without restraint.

In a certain high school the janitor complained that small bits of paper were left by pupils on the floor of the assembly room. He found it impossible to sweep these up; they could be removed only by the tedious labor of stooping and picking them up by hand. The janitor was an elderly gentleman, beloved by all the pupils. At dismissal that day, the scene was as follows:

PRINCIPAL: How many have ever swept floors? (*All hands go up.*) What makes sweeping difficult?

CLARA (*volunteer*): Sweeping under tables, chairs, iceboxes, or any places that are obstructed by furniture is difficult.

MAUD (*volunteer*): Sweeping up anything on the floor that sticks and is too small or flat to be budged makes it necessary to stoop down and pick it up. It's hard on the back and the fingernails.

PRINCIPAL: Yes, you know from experience. I am sure you realize what Mr. Bock [name of janitor] does for us every day. Now, I'm going to let you in on a little secret, but don't tell anybody about it. Today Mr. Bock told me that his hardest work during the day was sweeping this assembly room; hardest because there were so many bits of paper that stuck snugly to the floor; they could not be budged by a broom, and he had to stoop

many times each evening to pick them up one by one. Couldn't we do something to help him?

The pupils saw the implication immediately and from that moment they never left without picking up each bit, and they did it voluntarily. In this illustration the first two stages were lived in a short time, but practice continued indefinitely. It is an opportunity to practice that instils the attribute so that it becomes part and parcel of living, and not until that stage has been reached is the learning complete. Briefly, attributes must be practiced before they become parts of one's living; hearing, seeing, thinking, and feeling initiate, but the living instils.

To practice or live in a way befitting the acquisition of attributes there must be abundant satisfaction and inducement and contagion in the environment. No one can estimate the inner working of a pupil's mind as it reflects upon the worth-whileness of happenings in the environment, but surely the mind is enormously influenced by the impact of environmental forces. In reading my newspaper this morning, I found the testimony of a boy who told the judge that never would he be married, never! His parents were in court for divorce, cruelty the charge; and the boy, living in this environment, was disgusted with the thought of marriage, embittered upon one of life's most precious human relationships. While this incident is only illustrative, it implies much in teaching for attributes. Without the right opportunities for exercise, the attributes cannot grow efficiently. What, then, are the right environmental opportunities?

(A) First, the environment must afford opportunities to live wherein the attributes are seen or heard practiced at their best. Seeing and hearing are learning activities, and the character of the product learned tends to take on the same proportions as the character of the attributes constantly impacting upon the senses. While occasionally strong souls rise above the everyday environmental level, most souls keep to that level or drop below.

In this environment one opportunity for pupils to learn or acquire attributes will be the living with, and learning from, teachers—teachers with character, poise, balance, enthusiasm, and the highest personal development. Whether pupils learn directly or

indirectly, their learning will be influenced greatly by the teachers from whom the learning originates. Humor cannot be learned from a sour and constantly disgruntled teacher; kindness, from a cruel tyrant; broad-mindedness, from a narrow-minded and prejudiced instructor; politeness, from a rude and offensive associate. What a real opportunity it is for pupils to live and work and practice in the company of genuine characters.

(B) Active participation by pupils themselves should be provided and encouraged. One tends to become what he does; one learns to appreciate what he practices appreciating. Often a person confesses that he never liked a certain thing but that he changed completely after trying or experiencing it. Although there are limits to this learning by participation, it can be stated that no barrier should block the pupils' attempts to reach this upper limit; the opportunity for the maximum limit should be provided; real growth comes from stretching outward and upward to the maximum of one's possibilities.

Experiencing of music, art, literature, games, drama, and other forms of endeavor full of participation possibilities leads to more and more ability to understand and appreciate and enjoy these endeavors; indeed, ability to appreciate and to enjoy is acquired. It may be urged along by certain inherent capacity, but acquired it is nevertheless. So it is, therefore, desirable and even urgent that boys and girls be given every opportunity in school to participate in and experience the best that the school can offer in order to develop the growth of appreciations. No more can we expect these attributes to take care of themselves than we can expect health to take care of itself. A conscious effort must be made to gain anything worth while in life; the price must always be paid.

Experiencing of politeness, neatness, punctuality, suspended judgment, self-control, independence, self-reliance, tolerance, honesty, thrift, and other forms of conduct attributes builds up within the pupils abilities to live out better and better in their own daily relationships these desirable attributes. Here, again, the possessor must pay the price; these attributes do not take care of themselves—they are learned.

The learning during the practice stage should proceed in conformity with activities that bring about the maximum of inner transformation as contrasted with activities demanding strict conformity to an outside force. How should learning be directed to secure the maximum of genuine inner transformation on the part of pupils?

a) Give pupils an active part in initiating and formulating ways calling for the right exercise of attributes. The ways of adults rigidly enforced upon young persons produce conformity, but this conformity may be ephemeral. Pupils generally aim high; they are not by nature bad or wicked. Capitalizing upon their best inclinations and leanings, a teacher can increase the momentum of these and guide them into the desired channels. What shall be appreciated? What shall the proper conduct be? The answers to these questions may be somewhat different, but the pupils' contributions should be sought for and incorporated into the answers in so far as possible. If pupils feel that they had some part in the formulation of attributes, those attributes will be accepted as desirable in personal improvement. The pupil who brings a flower, a picture, or anything to brighten his classroom becomes an active agent in the appreciation of the appearance and beauty of that room. The pupil who had some part in formulating a rule of good conduct at a basketball game will try to behave accordingly because he is a stockholder in that rule.

b) Make the practice lifelike, pleasant, and satisfying. Why should doing the proper acts or appreciating the higher things appear to be burdens? They should not. Growing bigger and better is satisfying; the means to bring out that growing may, however, thwart the growing. There probably has been too much dictating, scolding, threatening, forcing, and punishing when there should have been more guiding, leading, praising, suggesting, living, and learning. The principle of self-activity works as truly in learning attributes as it does in any other type of learning. There is no learning without reacting.

(4) *Fourth stage.*—In the fourth stage the attributes have been acquired and are constantly functioning in living; the

learning is complete. Of course, this stage is the final objective toward which the three first stages lead, but the three beginning stages make possible the last or final stage.

A BALANCE IN USE OF TYPES OF LEARNING

This treatment of the types of learning is meant primarily to draw attention to the kinds of physical and mental processes employed by all persons in their efforts to learn. All types are used in the course of learning, but too often that use is not wisely and effectively guided. This task of guiding learning is no child's play; guiding learning is a scientific undertaking.

A teacher should use discrimination in her selection of types of learning. Reasoning cannot proceed without the materials upon which it can react; there is no wisdom in trying to think about something that one has never seen, visualized, heard, or experienced. Teachers must be everlastingly concerned with the backgrounds of pupils in all types of learning. Whenever the background is too weak to support reasoning, that background must be strengthened. This incident is related by a high-school graduate:

> Well, but sorrowfully, do I remember the problem given to me by my high-school physics teachers. It happened in the assignment which was the very first one dealing with electricity. The teacher said,, "Tomorrow I want Howard to arrange a demonstration showing the class positive electricity, negative electricity, bound charge, repulsion, attraction, and neutralization." I was dazed. Try as I would, no light came. The text mentioned an electrophorous; it said something about pith balls. What could these words mean? Nothing in my experience helped. I had never seen nor had I heard of positive electricity, bound charge, or neutralization. The daze deepened. Rather than admit defeat and failure to the class, a little check denoting absence was marked after my name the next day. My foundation was too weak, my sense of pride too strong.

A foundation, or background, can be built up by using the elementary activities in learning, that is, activities that can come first. Percepts can be gained originally, meaning that they do not depend upon a previous background, and these are useful in themselves as well as for use in higher types of mental activity such as reasoning. And then there is much learning of informa-

tion directly, or as we might say, by memorizing it. One cannot reason out all he must know; one acquires much by remembering outright what others have done, found out, and accomplished. By keeping a balance in the types of learning, it is implied that a teacher uses them in their proper places. Reasoning is out of place when it cannot operate to advantage or cannot operate at all. A pupil or an adult must first have materials with which to reason; therefore, he requires other activities in learning to secure these materials before he is asked to reason—before he can reason. Emotional learning, as the words imply, brings the feelings into play—it touches the emotions. Within recent years this type has been stressed more by educators and psychologists because so much of human conduct is governed by feeling. Although this type often works whether we will it or not, conscious effort must be exercised in teaching to have it work constructively; attitudes, convictions, beliefs, and ideals are so important as directive forces in our society that schools must strive for these feeling developments with renewed vigor.

There are significant differences in the various types of learning. Learning the name of a person is simple compared with learning to understand why the divisor is inverted in the division of fractions. But, notwithstanding these differences, each type of learning has its purpose.

Which type or types to use will depend upon the objective under consideration. If an understanding is to be gained, then the sensory and problem-solving types are obviously the ones to bring into play. Surely the emotional type must operate to a large degree if an appreciation is the aim. One can memorize a date or the name of a person, but he cannot memorize an appreciation. An appreciation is developed, not primarily through memory, but through the sensory, problem-solving, and emotional types of learning, in some sequence or combination. Even in learning facts and items of information, memorization should very often be preceded by problem-solving and emotional learning experiences.

As a rule, not one but several of the types are employed before an objective is attained. The types of learning are as strings on a

musical instrument—each one has its place and function, but several must vibrate to produce music. The relative roles of the types in the pupil's school experience must be thoroughly understood by the teacher in order that he may include all of them in his guidance of learning, and in combinations that will lead to the maximum attainment of outcomes. The omission of types that are essential, the use of the wrong type or types, and the use of one type for all purposes are the most serious weaknesses in teaching. An understanding of how genuine learning actually occurs is the only true guide to the appropriate use of the types in classroom situations.

Teaching is in large measure the right guidance of the learning process. Planning activities through assignments, questions, demonstrations, experiments, problems, units and other procedures must be based upon the type or types of learning most effective in promoting the growth of pupils. This planning is the responsibility of the best educational psychologist in the classroom, the teacher.

APPLICATION EXERCISES

1. An old couple entered a music store and after listening to a number of records finally bought "When You and I Were Young, Maggie." Two high-school girls going through the list of records bought "Chickery, Chick." What makes for the difference in selection?
2. Does understanding influence appreciation? Would dull pupils appreciate the same poetry as bright pupils? Why?
3. The Bible contains this statement: "Let your light so shine before men that they may see your good works and glorify your Father which is in heaven." Is it possible to shift emotional feeling from a person to the ideal the person believes or upholds? This is a hard question. Could the emotional shift be positive? Negative? Illustrate.
4. Are personal attributes learned more effectively through the indirect or the direct method? Analyze your experiences in learning attributes.
5. What poems do you like best? Why?
6. How influential is environment in helping the growth of conduct? Appreciation? Do playgrounds help to reduce juvenile delinquency?
7. A boy who was not very honest himself was a contestant in a pumpkin-growing contest. He worked all summer to raise prize pumpkins, and the evening before the day of the judging he walked among his large would-be prize winners and thought of the rewards he might win on the next day. While he was sleeping that night, someone stole the pumpkins.

Finding the patch raided, the boy cried pitifully. He said between tears, "I never knew how bad a boy can feel when somebody steals from him." Will the boy be more careful of his own habit of taking from others after this experience? Why?

RELATED READINGS

BOSSING, N. L. *Teaching in Secondary Schools,* chap. viii. 3d ed. Boston: Houghton Mifflin Co., 1952.

LANCELOT, W. H. *Permanent Learning,* chap. v. New York: John Wiley & Sons, Inc., 1944.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* chap. xii. 2d ed. New York: American Book Co., 1947.

RUEDIGER, W. C. *Teaching Procedures,* chaps. ix–x. Boston: Houghton Mifflin Co., 1932.

WITHERINGTON, H. C. *The Principles of Teaching,* chap. viii. New York: Prentice-Hall, Inc., 1939.

CHAPTER VI

PRINCIPLE 4: LEARNING SHOULD BE UNITARY, NOT FRAGMENTARY

WHEN a pupil enters the secondary school, his learning should become increasingly significant. He should begin to see relationships, to fathom causes and effects, to detect the motives and forces behind major events and eras—in short, to generalize and unify experience and knowledge. The higher mental processes are necessarily brought into operation to promote this deeper education; but, since education should become more profound from grade to grade, the secondary grades are appropriate for much of the initiation and fostering of unity in learning.

The housekeeper may find it profitable and convenient to learn the telephone number of the grocery store, the storekeeper finds it necessary to know the number of things in a dozen, the pupil must know his name, for certain imperative reasons, and everybody should be able to spell certain words correctly. Because many isolated facts are necessary in life, they should be learned; the demands of life surely do require the retention of single items.

Unitary learning, however, implies that what is to be learned is larger and more involved than a few scattered fragments. This kind of learning necessitates the use of interrelationships and interlocking ideas before a final and highly significant understanding or insight is "generated."

Before considering further this particular principle of teaching, a few illustrations depicting the difference between unitary and fragmentary learning will prove valuable.

DIFFERENCES BETWEEN UNITARY AND FRAGMENTARY LEARNING

Burton illustrates excellently the difference between unitary and fragmentary learning:

The difference between true and pseudo learning, and between mastery and so-called "partial" learning is clearly shown in the following case. A child was found who could add, multiply, subtract, and divide accurately when told to do so, but when left to herself was just as likely to subtract numbers intended to be multiplied or divided, or vice versa. Since she could add a column correctly, could multiply and divide large numbers accurately when told to add or to multiply, most teachers and parents would say that she had learned, at least learned "in part" to add, multiply, subtract, and divide. But in fact the child had learned none of these things even "in part." Diagnosing her difficulty, a teacher elicited the following statement from the child:

"I know what to do by looking at the figures. If there are only two numbers with lots of parts (digits), I subtract. If there are lots of numbers, I add. But if there is just two numbers, and one is littler than the other, then it is a hard problem, so I divide if they come out even, but if they don't, I multiply."

The child is obviously in the stage that most people would call "having partly learned." As a matter of fact, she has not learned (to add, multiply, subtract, or divide) at all. She has memorized number combinations and has acquired certain skills in manipulating them. She has quite obviously learned something (the associations and skills), but she has not even "in part" learned to add or subtract. The fundamental in addition is to recognize situations that may only be solved by that process. The understanding is then carried into action through exercise of certain skills. This child acquired the skills first, and has not mastered the understanding at all.[1]

Another illustration of the difference between the two kinds of learning comes from the experience of a high-school Senior:

In my high-school Freshman English class there were the principal parts of verbs to be memorized—scores of verbs, to be exact: *go, went, gone; see, saw, seen; do, did, done;* then there were rules: *is* takes the singular, *are* takes the plural; again more rules, the verb must agree with the subject in person and number: *I do, you do, he does; I was, you were, he was.* I memorized these forms and could sing them out as tunes.

As a member of the debating society, I won the honor of being selected one of the six Freshmen to appear in the annual public debate. Unknown to me, in that audience the night of the debate, was my English teacher. She had a pad and pencil; I presented the arguments; she checked the results. On the morrow I was notified to call after school in Room 17, the English room. Why should I be kept after school? My conduct was satisfactory. On making my appearance that evening, this news came unexpectedly: "In your debate last night you made twenty-seven grammatical errors. Here they are. You said: 'I have never saw; there is no figures; he don't know; they done no such thing, etc.' " Humiliated and forlorn, debate lost, gram-

[1] W. H. Burton, *The Nature and Direction of Learning* (New York: Appleton-Century Co., 1929), pp. 27–28.

mar condemned, I wandered homeward. Not even the sun was shining that evening. Out of the blackness of the past came an idea:

Probably my study of grammar is to help me in expressing myself correctly in debating, talking on the street, conversing with others; probably grammar should be thought of when one is outside the classroom; oh, yes, grammar must be more than singing of tunes and memorized rules; now I must think of it, use it, and master it so that it carries over into all my writing and speaking; yes, grammar is to be used in life. I need it, I feel its value. I must use it to assist me in my living with others. Why didn't I think of these things before? Why didn't my teacher tell me? Why didn't she have me express my ideas in good English during class work? It isn't too late. I may be a sadder boy, but I am a wiser one.

An analysis at this point should reveal several initial ideas about unity in learning. The first of these is that a complete course or cycle of mental and physical operations must be run before the pupil has learned in full. Second, certain manipulations of learned-by-heart materials are too frequently considered all there is in learning. On the contrary, full learning or a complete cycle contains every operation needed between initial awareness and final use and application. Learning is not unitary if it drops off before application is reached; yet so often the memorizing activity is the only one employed, with the inevitable failure or inability to use and apply the facts and information in meeting life-situations. In the third place, the learner himself is not conscious of the needed completeness and finality of learning, unless he is confronted with situations, real ones, which pull upon his mental operations until the cycle from awareness to genuine application or appreciation is completed.

The gap between school learning and the practical application of knowledge in life-situations has often been pointed out by critics of modern education, and such a reminder should be heeded because so much school work is reduced to mechanical manipulations and memorized rules devoid of meanings, understandings, and finalities.

Unitary learning is more than organization if organization implies only the gathering of more materials. Unitary learning means that a skill, concept, appreciation, understanding, or insight has been fully attained; and, unless the learning continues until the accomplishment has been realized, the learning is par-

tial, incomplete, and fragmentary. It is not a question of so much material, so many facts, so much information, so much time, or so much reading, but it is a question of effort required to produce an ability.

It should be remembered that unitary learning is relative, that the dimensions of unity will vary with the learners involved and with the objectives under consideration. In some cases unity is confined to narrow limits, while in other instances it can be profound and continuous. Both pupils and objectives determine the degree to which unity can and should be carried, but under all learning conditions the maximum degree of unity should be sought.

Unitary and fragmentary classroom work contrasted.—Two illustrations from actual junior high school teaching will bring out more clearly the difference between unitary and fragmentary learning. Both illustrations are in review lessons in American history. (1) In the first case, a pupil had one question which he asked some member of the class to answer, and the pupil called upon then answered and in turn directed his own question to some member who had not yet recited. Questions were of this nature: (*a*) How many beaver skins did it take to get one hundred pounds of tobacco? (*b*) How many pairs of shoes could a man get for two hundred pounds of pork? (*c*) How many hours did a man in Boston have to attend church on Sundays? (*d*) At what time did the Puritans have to go to church on Sundays? (*e*) How many hours was a man kept in the pillory in Boston if he kissed his wife on Sunday? etc. During the review there were constant waving of hands, correcting of answers (even to fractional parts), and opening of textbooks to verify conflicting testimony. (2) In the second case, a few floor talks were given during the period. One small boy began his talk as follows:

> We cannot get a good picture of life in the colonies without knowing something about trade. Some people lived in the cities and these people made things. They made shoes, clothing, and many other things. The farmer raised wheat, corn, tobacco, and cotton, and many other things. Trappers and hunters got furs. The trappers and hunters needed shoes and food so they had to give their furs for some things the people in cities made, such as clothing and shoes. A preacher would get meat and shoes, and other

things to eat or wear, for preaching. People in the South who raised cotton got clothing and tools from the English for their cotton because there were no mills down South to make clothing. At that time, a farmer would go to town with a wagonful of corn and potatoes and meat, and come back with shoes and clothing and tobacco. When a man gives meat for clothing, we call that barter. Today we have money, and a man can carry enough in his pocket to buy all he needs, but at that time he needed a wagonful of things to get what he needed in town. Trading was hard, too, because there were no good roads or railroads.

For some time this boy continued talking, giving his version of trade in the colonies; exchange, barter, transportation, money, products, trade difficulties, and reasons and causes for all trade conditions in that period of history. When this boy finished, the teacher and pupils evaluated and, if necessary, rounded out the idea of trade conditions in Colonial times. After this talk and evaluation, the teacher asked, "Whom shall we ask to tell us all about the religious life in the colonies?" The class chose Henry for this discussion, and Henry gave a good account of religion as found in various sections of the thirteen colonies. A few other important phases of Colonial life were reviewed, education and government being among them.

These two review lessons can now be evaluated from the standpoint of the fourth responsibility of a teacher as a director of learning. It is not even necessary to secure the statements of these two teachers in order to discover their notions of what unitary learning is. The pupils' performances indicate clearly the notions held by the teachers. (1) In the first case fragmentary learning was going full speed; small bits of information were considered important; pupils saw no more than the number of hours and pairs of shoes in history; there was no development of causes and effects in historical events; there was no generalization derived from numerous occurrences; and organization of facts and events into significant phases of history was nonexistent. Fragmentary learning was at its height. (2) In the second case pupils were working to understand and appreciate Colonial life (see boy's first sentence in his floor talk). In this class pupils set out on an undertaking of appreciable size and difficulty; there was something to find out and to see in its completeness; instead of

considering barrels of pork and pairs of shoes as history, those pupils used these items to build up a mental picture of trade during Colonial times; into this complete picture of Colonial life went significant ideas, such as trade, religion, government, and education; pupils did not quibble over details but got up and gave connected and organized talks on major phases of history under consideration. Unitary learning, here, was practiced to a commendable degree by the young historians.

UNITY DEPENDENT UPON DEGREE OF UNDERSTANDING OR INSIGHT EXPECTED AND PROPER GUIDANCE OF LEARNING

A common illustration of learning will help to show how unity is fostered by means of a problem demanding a relatively high degree of understanding for its solution, and how guidance of learning assists in the securing of that understanding. Our illustration will be the gasoline engine.

Some machines utilize the power in man's muscles, but in the gas engine the power comes from gasoline. *Just how can power be generated by a machine and applied in such a way that it does work for man?* It is the general over-all and guiding thought of the preceding inquiry that produces unitary learning. All the subsequent study will be directed toward how it is done. Every bit of information, every question, every thought, and every relationship will be utilized for the understanding of that general concept.

Where does the power come from? Gasoline. But how? The gas when mixed with air and under pressure and ignited produces an explosion. How is that power harnessed? How is the gas mixed with the air? How is the pressure secured? What causes the compressed gas to ignite? When is it ignited? How do you get something to move or turn so that a wheel or rod revolves in order to move the rear wheels of an automobile or to turn a wheel to which a belt or chain can be attached? How do you get the engine to start? Why does it keep on running? Where does the burned gas go? How can the engine be stopped? If all these operations go on while the gas engine operates, then it is necessary to see and study how these are done by that piece of ma-

chinery. *Note, however, that the guiding thought is directed toward the generation and utilization of power.*

Fragmentary learning can be illustrated by a bit of knowledge that one has acquired but does not associate with anything because it has no working relationship and has no function except as an isolated item. One may know that electricity will jump over a short gap or a break in a circuit; that is a bit of knowledge, isolated, fragmentary. He may never have associated a spark plug with this knowledge in any useful or functional relationship.

Actually the spark plug is a gadget to get a stationary gap in a circuit so that there will be a spark in the place only where it is wanted. Now, where is that place, and how do you get it to spark when it is supposed to spark, and why should it spark anyway? Well, when the gas and air are mixed and compressed, that is the time to get a spark so that the mixture explodes most violently. Yes, but what happens so that the spark comes at the right time and what moves when the explosion occurs? And where does the electricity come from that sparks in the spark plug?

Indeed, one is beginning to think when he asks the preceding questions. He is beginning to realize that the spark plug has a part to play in a gas engine; that it ignites the mixture of gas and air; that it is a gap in an electrical circuit; that electricity is necessary; that the spark must come at the right moment; and that something else must happen so that the spark comes at the right time. In other words, he starts with a bit of knowledge and extends it to spark plug, place for the plug, time for the spark, need for the plug, where the electricity comes from that produces the spark, where the explosion occurs, and why, and what happens to the power generated. He is beginning to build a concept, an understanding. If he keeps on, he will have a complete mental grasp of the operations of a gas engine.

Unitary learning means that there is a constant development of relationships, functions, and ideas. It is the combining of one part to another part until a whole emerges, or it may be the general concept of a whole at the very beginning followed by the place of parts in forming that whole, or it may be, and generally is, both of these working simultaneously. One may get a

general idea of the gas engine as a whole, that is, the idea that gas is utilized in some form of machine to generate power and that this power is used to produce motion in a rod or shaft or wheel, after which he proceeds to study what parts are needed or how they are related to produce the general effect. This last way is very effective and logical whenever the maturity, experience, and background of learners are equal to the occasion; at other times, there may be more of the part-to-part learning until a unitary concept of some kind emerges. In many cases, both of these movements proceed at the same time.

The gas engine is just one example, but the idea of how to guide learning to promote unity can be applied equally well to historical developments, social problems, mathematics, science, and practically every area of learning.

Unitary learning has directive force. Selection is increased; the why's and wherefore's stand out. Learning becomes purposeful in terms of causes and effects, relationships, functions, understandings, and insights. Unity implies wider and deeper meanings; it includes broader interpretations and applications; it signifies ability to generalize and organize.

Unitary learning and its direction.—Unity is developed, it does not just happen, it is not instinctive. To promote its development is a principle of teaching; if pupils could study efficiently without direction from others, there would be no need for teachers.

Pupils need to be made aware of the aims in unitary learning, otherwise these young learners immediately and quite naturally strike upon the fragments as ends in themselves. Doubly certain is this fragmentary learning likely to occur when teachers themselves teach and test for fragments as the *summum bonum* in school work. "Why didn't my teacher tell me? Why didn't she have me express my ideas in good English during class periods? Why didn't she remind me that good English finds an important place in debating?" These questions are sad ones, asked by one who was unaware of unitary learning until grief made him aware; not until he was really concerned did he learn with a definite end in view.

Basic concepts should stand out in clear perspective continu-

ously during study, surely at the beginning, but likewise in the middle and at the close. It is a teacher's responsibility to keep pupils thinking of the development under consideration. The parts are never greater than the whole. The parts do, however, buttress the whole; they are the materials that must be shaped and fitted together meaningfully to produce the final understanding. Thoughts acquired in study should lead up to a larger thought until a significant central idea or concept emerges. In the case of unitary development the central idea or concept is a skill, ideal, appreciation, attitude, understanding, or insight. For example, many history teachers, instead of leading up to the Constitution, plunge into the very middle of the Critical Period by making an abrupt assignment of the Constitutional Convention. The Convention and its product, the Constitution, are considered by the pupils as just something more to be memorized from the textbook; there is no motive for study, nothing to be corrected, nothing to be solved, nothing to be appreciated. "Theirs not to reason why!" Only the study of more pages, only another lesson to be painfully memorized and listlessly recited! Pupils, unaware of anything to be understood, do not study to understand; they memorize the "lesson-to-be-learned." Pupils need guidance. They need to be made watchful of historical developments; they should be guided to keep the constantly growing problem or development in mind, because the ultimate understanding does not come into relief magic-like and full grown. During their study pupils need to be guided into those activities that gradually and surely lead to the development of thoughts—thoughts that finally culminate in a complete and significant grasp of the objective under consideration.

This fourth principle of teaching—guiding learning so that it becomes unitary—has been too frequently lost sight of in classroom instruction. Whatever one is preparing and planning to teach should be pondered over many times from the viewpoint of bringing about deeper comprehension in the minds of pupils.

In a following chapter unitary learning will be further developed in connection with the unit concept of planning and teaching.

APPLICATION EXERCISES

1. We often hear it said that a person knows his subject but that he cannot teach. As far as the complete act of teaching is considered, is such a person's learning complete?
2. Can you give some instances of your high-school learning which lacked unity? Wherein was the learning incomplete?
3. What would you consider unitary learning in studying to be a good auto mechanic? In learning to drive an automobile?
4. Can you tell why so much of school instruction in citizenship appears so ineffective? From the standpoint of unity, where do you believe the instruction is at fault?
5. The story is told of a bright young man who won high honors in an electrical engineering school, yet this person had to call in a handyman in his neighborhood to fix the electric doorbell when it failed to respond to the push button. What was fragmentary in the engineer's learning?
6. We have depended upon knowledge of grammar, knowledge of health rules, and knowledge of government to help us speak and write correctly, live right, and be good citizens. The results have been frequently disappointing. Why?
7. Prospective teachers quite generally must take one or more courses in educational psychology. Very frequently, too, these same teachers apply little of the psychology when they teach later. Explain.

CHAPTER VII

PRINCIPLE 5: THE ENERGY OF PUPILS SHOULD BE RELEASED SO THAT THEY APPLY THEMSELVES FULLY

PUPILS are stockholders in the learning enterprise. In one respect, that of possessing energy, they own all the stock. The teacher is a director. Unless energy is released, no learning can take place. From the standpoint of instruction, the releasing of pupils' energy is called "motivation." A vital principle of teaching is the releasing of pupils' energy and the directing of it into profitable ways of learning the most worth-while objectives.

In determining how energy can be released, no rule-of-thumb techniques will be proposed. Unless study of this problem is based upon a real knowledge of the pupils themselves, their motives, their mental and physical and emotional leanings, their natural and acquired inclinations, and their equipment for doing and reacting, no reliable findings will be forthcoming. Forces within pupils cause the release; an outside facilitation of that release can succeed only when it pulls in the same direction as the forces within.

FORCES BEHIND EFFORT

To discover the forces acting within pupils, the proper procedure is to study young persons when they are under conditions approximating natural freedom. Visualize this example of living under freedom:

John had longed for a bicycle for quite some time. One day his wish was fulfilled when his father gave him the coveted vehicle. John was now his own master; no rules, no regulations, no rewards, no punishments were handed down. Bruises, bumps, jars, falls, and tired and aching muscles resulted. Progress was slow. John did not waver or find fault; day after day he kept trying; now and then a little success, now and then another fall, now and then a tear. No statements such as these were necessary: "You must practice an hour each day"; "Mother will give you a dime if you take the

lesson today"; "You can never become a great rider if you do not work a little every day." Rather there were these: "John, you will ruin yourself if you don't take it easy"; "John, it is dinner time, you must put the bicycle away and eat"; "Dear me, I must get my boy to stop before it becomes too dark." Day after day John works; each fall is only a boost, each bruise is only an added stimulus, a tired muscle is only a feeling to be treasured. John perseveres, he wins, he learns to ride. A great accomplishment, a hard one! It took weeks to do it, but it was done.

What, then, is motivation other than the utilization of the stored energy within pupils, energy ready to be set to work at worth-while undertakings if it is only tapped and directed wisely? The story of John, if carefully analyzed, gives a few clues to the forces residing within pupils which can be stimulated and utilized in any learning, inside or outside of school. What made John work untiringly and strenuously in learning to ride a bicycle? What makes any pupil release energy and apply it? The forces can be found in the analysis of this natural situation and in other situations near at hand. Not in the study of faraway fields or imaginary peoples need one go to find the answers. The painstaking study of boys and girls as they are will give the real, common, and workable information.

Let us analyze the forces operating within John that kept him releasing energy while his learning was going forward:

1. John realized the worth of knowing how to ride. Possibly he wanted to peddle papers with his bicycle, or perhaps he wanted to ride in order to be the equal of boys who could ride. At any rate, he had some value or need in mind.

2. He probably kept trying because he felt the joy of adventure. Of course, it was not the "call of the wild" form of adventure, but it was an adventure in doing, in matching himself with the potentialities embodied in that two-wheeled instrument. Could he win over that vehicle which turned, leaned, and sped? Could he conquer the thing that threw him, bruised him, and defied him?

3. Then there is the joy of achievement. One likes to be able to do something that he could not do before. It is not natural for one to live on the same levels or in the same ruts too long; the urges to do better, to do differently, and to do more are parts of living.

4. Closely related to achievement is success. John could feel successes from day to day. Taking fewer tumbles, making longer rides, negotiating turns, keeping on the narrow trails and paths, all these were successes, giving greater confidence and satisfaction and determination.

5. The learning was real and lifelike. So often learning is confined to

books, to symbols, to words; but in John's case it was true to life, real, the actual thing. When reality is divorced from learning, that learning becomes a job for the abstract thinker and learner. Too few of these thinkers and learners exist to standardize a pattern of learning for the overwhelming majority of pupils. Even the genius cannot labor joyously forever in the field of abstraction. A human being longs to be in the realm of actualities.

6. The learner is a stockholder in the learning to be done. John decided that the learning was his, his job, his undertaking; no threats, no warnings, no commands, no dictatorial power or authority from without hung over him. "Where the treasure is, there will the heart be also." Likewise, where one's determination is, there will learning be at its best.

7. Manipulation was a factor in motivating John. Man has been a manipulator too long to ignore the urges lying within his muscles, bones, and nerves; he leans toward motion, contact, handling, shaping, building, and production reactions. While the child manipulates his blocks, he will in years to follow manipulate in the activities of singing, speaking, drawing, painting, examining, experimenting, and other higher forms of reaction; but manipulation, in whatever forms it may be, is a powerful urge toward activity.

8. Probably John felt the social approval that would be his when learning was complete. The smaller girls and boys might marvel at his dexterity. A word of praise might be his in the future. Who can really tell what his ears might have heard or his eyes might have seen in that dreamed-of future!

While this investigation of John's efforts is not intended to analyze out of human nature every possible force, it does imply that there are many forces. A teacher who would use these forces or drives to promote learning must strive to discover the conditions under which these forces or drives operate. The pupils who are to do the learning should be studied and understood just as well as the teaching materials are studied and understood. The really efficient instructor brings the aims and the efforts to attain them into a harmonious relationship; if they remain on unfriendly terms, both suffer. The teacher who said it was her business to teach history, and the business of pupils to learn it, or fail, had the wrong notion of the true purpose of teaching. The application of pupils to their work, their expenditure of energy, their physical and mental exertions, are weighty factors conditioning the kind and amount of learning which will result. This application, this expenditure of energy, and this exertion do not surge forth under all circumstances; they do come when the nature of the pupils,

and the nature of the materials to be learned, are harmoniously and intelligently and psychologically directed into an agreeable partnership.

There is no denying that John's nature and the nature of the aim were an agreeable partnership. Of course, the learning was not school-initiated, but why should not John, or any other pupil for that matter, attack school learning as energetically and persistently as he does out-of-school learning? Pupils seem to have a dual nature: one that manifests itself in school and the other out of school. The in-school nature appears to be slow, passive, halfhearted; the out-of-school nature seems to be joyous, active, wholehearted. The truth is that a pupil has one nature, but the in-school and the out-of-school situations react differently upon that nature. A way must be found to use that nature correctly in school so that all teachers will say, "John, do stop working algebra (Latin, English, science, etc.); it is five o'clock now, and you must go home or your dinner will be cold, and darkness will be upon you before you get there."

THE TEACHER AS THE MOST IMPORTANT SOURCE OF MOTIVATION

The center of motivation in school is the teacher. It is she who has control of the forces which react upon pupils. Unless the teacher herself exercises this control wisely and effectively, she cannot expect from pupils a full measure of application. It is she who brings out the latent energy of pupils; or, contrawise, it is she who allows that latent energy to lie dormant. In other words, the possibilities are lodged in the teacher. The extent to which the teacher possesses these possibilities and utilizes them determines the extent of the release of pupils' energies. The teacher is a source of stimulation, and she does something that taps the abundant supply of energy residing within pupils. *What is she* and *what does she do* to secure this desirable application of energy?

THE TEACHER

In practically every investigation relative to success in teaching, personality looms up as conspicuously and continuously significant. Barr, in his book, *Characteristic Differences of Good*

and Poor Teachers, writes: "Notwithstanding the importance attached to discipline, technique, and knowledge of subject matter, it has been found here, as in previous investigations, that the chief sources of weaknesses among poor teachers are defective characteristics of personality."[1]

At this time it would be a simple matter to list the dozens of desirable traits that investigations show are possessed by outstanding teachers. Your problem is to be solved by actually feeling the effect one person can have upon another; therefore, you must put yourself in the place of a pupil and view from his side how certain qualities in the teacher would affect you and your latent energy. For example, pupils state that they work best for the teacher who is patient. Why do pupils say that? Suppose you are in a class and the teacher sends you and a few others to the blackboard to work original problems in algebra or geometry. In a certain length of time the others have completed their problems and have passed to their seats. The teacher turns to you and says, "Dear me, you're always like a sheep's tail, always behind; some one of these days you're going to finish first, and then I'll surely die of heart failure." How do you feel? What will you think of the teacher? Are you motivated to work harder, or to rebel, quit school, and forever hold bitter memories of mathematics and the mathematics teacher? By imaginatively living through this situation and similar ones, you may begin to realize the importance of the teacher in obtaining the release of pupils' energies.

Again, pupils state that they like enthusiastic teachers. What bearing does enthusiasm have upon the desire or inclination to study? If you were a pupil, would you experience a startling difference between an enthusiastic teacher and a lifeless or indifferent teacher? Suppose you are in a history class; the teacher sits at her desk and looks blankly around; not a smile nor a bit of humor nor an emotional or interest reaction ever emanates from that stoic appearance. History is a series of facts or events to be

[1] A. S. Barr, *Characteristic Differences in the Teaching Performance of Good and Poor Teachers of the Social Studies* (Bloomington, Ill.: Public School Publishing Co., 1929), p. 117.

memorized; there must be no deviation from this serious classroom labor. Marie Antoinette's jibe, "If they haven't bread, let them eat cake," or Patrick Henry's "Caesar had his Brutus, Charles I his Cromwell, and George III (Treason! Treason!) may profit by their examples" arouses no more enthusiasm in her than the cold facts that Periander died in 585 B.C. and Balboa died in 1517. This teacher is much more enthusiastic about putting a zero after a pupil's name in her daily record book than she is in Caesar's crossing the Rubicon or in the invention of the cotton gin. In the former she makes a move in recording; in the latter there is no discernible motion, physically, mentally, or emotionally. Pupils are dying by inches and soliloquizing: Why must it be ever thus? No wonder pupils want enthusiastic teachers. The inner nature of pupils longs to live history, but it cannot if it receives no encouragement.

Motivation is chiefly a human relationship, not a technical or statistical one. Knowing a list of desirable teacher traits probably never made a teacher successful; the mere recording of these traits can be done on a talking-machine record as well as in a teacher's mind. In training teachers, too much faith is placed in memorizing a list of traits, while more faith should be placed upon the living exemplifications of these forces. A good teacher is a real, living portrayal of the forces that stimulate. What a teacher is determines in a large measure what she can expect of others.

WHAT THE TEACHER DOES

The second factor upon which attention should be focused is what the teacher does to secure the release of pupils' energy. Again, the answer cannot be found in any rule-of-thumb technique. The teacher can succeed in securing human exertion only to the extent that she discovers and utilizes the forces which reside within human beings. What the teacher does, therefore, influences decisively how these forces are brought to bear upon the promotion of learning.

Values and needs.—What does the teacher do, specifically, to effect application in classroom learning? Why did John keep

plodding everlastingly in learning to ride? A true answer to this latter question should lead to the discovery of several factors. Surely, the value or need of the ability increases exertion. Some teachers interpret value or need too narrowly and revert to such reminders as: "You'll need to know this for the final examination" or "You'll need this information when you study higher mathematics in college" or "You'll never become an engineer unless you master algebra." Value or need, in the intended meaning, implies a feeling of life-significance which is not too remote or far-fetched. The need for grammar is found in daily conversation, in classroom discussion, in debating, public speaking, writing of letters and newspaper articles, and in other everyday situations. Health, citizenship, reading, spelling, literature, history, and a host of other subjects have their immediate values and needs. It is not necessary to hold the final examination or college necessity over pupils as reminders; there are enough values, if properly unearthed, to arouse pupils to want them in living now. Of course, not all aims in school work possess equal values from the pupils' viewpoint; but, even so, any teacher, regardless of the subject she teaches, can find abundant opportunities to bring out the present value possibilities in the learning of pupils. It is expecting too much of pupils to insist that they learn merely for learning's sake; pupils do not respond to the old saying: "You may need that some day, so study hard while you have the golden opportunity."

Application.—Associated with the foregoing factor is another which can be labeled as the application factor. Too often learning stops with mere verbal acquisition or memorization of materials; and the pupil misses, thereby, the joy and satisfaction which come when the materials learned are actually applied. The joy in complete learning of grammar is the use of it in everyday language; the satisfaction which comes from applying one's knowledge of electricity to the fixing or installation of a doorbell is invigorating; the application of principles of economics to happenings in present industrial life is stimulating; the making of biscuits is more gratifying than memorizing recipes; the orig-

inals in geometry are far more provocative of thought and action than are the theorems stated and proved and ready for memorization. Much motivation comes from complete learning, meaning that good teaching and thorough learning are, in combination, very inducive to expenditure of energy. The pupil becomes tired and bored with mechanical acquisition of facts and definitions and principles and rules, all divorced from the final and interesting part of learning—application.

Understanding.—Another factor in motivation—which, again, is a part of learning—is understanding. It is surprising how much motivation is part and parcel of learning itself. Archimedes jumped from his tub of water with complete joy when he derived an understanding; likewise does any individual feel stronger and happier when he really understands something, especially when he gets that understanding through his own efforts. The pupil who solves a problem, of whatever nature, glows with determination and self-satisfaction; he prepares himself to do more, to work harder and longer. He takes an interest in the labor before him. It is the continual absorption of materials by boring repetition and memorization that lowers ambition to the zero point. A teacher, therefore, watches the learning process in her endeavor to secure abundant release of pupils' energy.

Emotions.—The teacher who expects a full measure of pupil effort sets in motion, wherever possible and profitable, the emotional forces that lie within her learners. Countless parts of subjects are to be lived and experienced emotionally; they were never intended to be dry-as-dust facts, to be instilled by countless repetitions or mental gymnastics. Poetry, literature, history, science, hygiene, biology, and all school subjects have numerous ideas and ideals which touch off the emotional and appreciational powers. Interest! Why, it is the arousal of one's emotions in connection with many events and occurrences in these subjects or units that produces interest. Why seek in a mysterious way for that intangible interest when it is right before one's eyes if he can but realize it? Many of us look for interest as residing in some faraway land; others think fairies bestow it as a gift. Interest is

close at hand; it comes truly and surely if the conditions that release it are provided. The boy in the history class who said, "Any queen who could be so thoughtless and inconsiderate of the suffering of the masses by making fun of them—eat cake if you have no bread—deserved no mercy," was beginning to live and appreciate the psychology behind righteous indignation. That boy was in a mood to study history, to exert himself; he gained an idea that aroused resentment. Call this mood what you will, it is, nevertheless, a strong factor in motivation. Be this mood pupil- or teacher-initiated, it matters little; it is inducive to genuine interest and effort.

Interest in pupils' growth.—What else does a teacher do? She does more, of course, than the few things already mentioned. Among the traditional things, the first to be treated is the manifestation of interest and concern over the pupil's growth and success. It is natural for a pupil to want to grow and succeed, and to know that the teacher is also concerned and interested in his growth produces a vigorous attitude of the pupil toward his own progress. While supervising and observing the growth of pupils, the teacher who secures motivation is the one who treats learning difficulties as problems to be diagnosed and remedied, not opportune occasions to reprimand or criticize. Individual differences must be respected. Success for each pupil should be judged according to the ability of that pupil, and every opportunity to succeed according to ability needs recognition. The teacher who watches for and recognizes the obstacles preventing success, and leads a pupil by appropriate helps and suggestions and words of encouragement to emerge as a success, wins the admiration of her pupils and increases their determination to work.

While the author was engaged in conversation some years ago with a man well in his fifties, the incident which follows was related:

> I remember my advanced algebra teacher's attitude when I received the lowest grade in an examination. She told me that advanced algebra was beyond me and that I had better change to some easier course before the semester was too far gone. What a stimulus! Instead of battering my ambition down to zero, which that caustic remark would do in 99 cases out of

100, it made me furious. From that moment I got busy, not because I liked algebra or the teacher or the bright pupils, not because I felt any need or value in algebra, not at all; I was out for pure revenge. I would show that heartless teacher and the pupils who connected, with derision, the grade of 85 and my name. With no help or encouragement from the teacher (who gave me neither), I battled my own way to the highest grade in the final examination and the second highest grade for the course in a class of twenty-five. Her closing remark was, "Well, William, you did better than I expected you would."

Revenge, as a means of motivation, is negative and uncertain. Put your trust in the positive means of diagnosis and remedial measures and encouragement; these are uplifting and refreshing and certain.

Utilization of pupils' inclinations.—In what other directions can one look for ways to tap hidden sources of energy? Are there instincts or drives or innate tendencies which can be utilized? When you become a teacher, experiment with your pupils to discover what they are and what they possess that can be aroused and directed toward effort in learning. Recall your own experiences to help you, regardless of the cries made by some psychologists that introspection is poor psychology (teachers do not overwork the process of introspection anyway). In either case, keep thinking about and discovering that which is good and wholesome. Your list of instincts or tendencies will no doubt include these among others: curiosity, gregariousness, play, physical activity, mental activity, manipulation, adventure, social approval, expression, and acquisition.

A high-school principal's testimony may add meaning at this time. He related his experiences with two music teachers in his school. One teacher was highly successful; the other almost a failure. The failing one seemed to cross pupils at every turn (unknowingly, of course), by her threats and scoldings: "That's not singing, first-graders could do better"; "Now sing, don't act as if you were deaf and dumb"; "If that's harmony, then I prefer the rattle of tin cans tied to an automobile." In the assembly meetings pupils balked outright when she led the singing; in her classroom there was some singing, but it was weak and lifeless. The successful teacher had pupils with him at every turn (you figure out the cause). He spoke as follows: "That was good, but I believe you can do it even a little better"; "I missed something that time, I didn't hear Fred's voice; the next time Fred will be with us"; "You sang that much better today than you did yesterday." The singing at assemblies was spirited when he led; in his classroom there was real singing.

These two examples show that something was done in both cases; in one the hidden sources of energy were pushed farther back; in the other case, the sources were tapped and abundant energy surged forth. You may be certain that pupils learned much more in one class than in the other. The moral in the principal's testimony is that pupils will respond when the right stimuli are provided, and they will sink back into inactivity when the wrong stimuli are used. The name given to the inclinations of pupils (instincts, or tendencies, or urges) matters little; the fact is that there are inclinations, and with the proper foresight and regulation of conditions these inclinations can be aroused along lines supporting the release of energy to increase learning. One cannot slap you across the face and expect your co-operation; neither can he call you a dunce and expect your love and admiration; human beings are not built that way. Some of the inclinations can be easily directed. A word of praise by the teacher is a small thing, but, nevertheless, it utilizes the inclinations to enjoy social approval; a problem gives the inclination of mental activity a chance to operate. All along the line these inclinations are present, in school life and in adult life. The teacher who knows more and understands more about living and life and human beings will know more about motivation. When the hidden springs of energy are discovered and utilized by the teacher, then and only then can she expect a full application of the powers residing within pupils.

Good teaching.—Motivation is the bringing-together of many inclinations and drives possessed by pupils and the utilizaton of these inclinations and drives to attain the desired ends. By understanding pupils, one understands motivation. He who neglects the ones who do the learning neglects the power which supports learning. He who has a wholesome view of education knows that pupils must live and learn, and he makes that living and learning an enterprise, not a painful burden. Much motivation emerges from good teaching and good aims, not from an external inducement. The psychological phases of teaching, as they relate to direction of the learning process, must be strongly emphasized as immensely important in securing motivation. So often we hear

it said that good teaching in itself motivates, and rightly so, because good teaching includes, among other things, good purposes and the wise direction of learning. The teacher who sets the stage for learning to take place, who uses wisely the types of learning, who brings out aims with sufficient clearness and significance and vitality, does much to secure motivation. In fact, without these, the other things she does cannot fully compensate. Let us beware of the tricks and techniques in securing the release of pupils' energy and put our faith in the permanent and fundamental factors supporting human exertion.

LAWS OF INTEREST

Laws of learning form a large portion of the content of educational psychology. Thorndike's laws, particularly the laws of readiness, exercise, and effect, have become passwords with educators everywhere.[2] Since some laws of learning include the interest element, as the laws of readiness and effect, it may be presumptuous to extract the element of interest from the compound of learning and treat it separately. However, it seems that this separation is justifiable because no other term in education has been proposed to cure so many ills as the word "interest." When the educational process works smoothly, interest is the cause; if progress is too slow, more interest is needed; if discipline is poor, interest is lacking; and if there are too many failures, lack of interest is the contributing factor. To create interest is not so easy as to advise someone to develop it. The discussion already completed embodies the laws, but as a summary the important laws of interest are stated and explained briefly.

1. *Create a felt need.*—Some subjects, such as stenography, typing, and auto mechanics, are so specific in aim that they are selected to satisfy felt needs. Other subjects, perhaps, are general and abstract, yet needs for these subjects can also be generated if opportunities are fully utilized. Needs for appreciations, thoughts, ideals, attitudes, information, conversational ability, beauty, and recreation are often more powerful than vocational wants.

[2] E. L. Thorndike, *Educational Psychology, Briefer Course* (New York: Teachers College, Columbia University, 1923).

2. *Approach new aims through past experiences.*—The spoils system can be abruptly introduced as a "lesson-to-be-learned" or it can be fascinating because it is an extension of past experience. From favors shown friends, from one good turn deserves another, from school and city politics to state and national governments of today and back to Andrew Jackson runs the human practice of bestowing favors upon favorite ones. Algebraic equations can be boredom intensified or they can become intriguing ways of solving problems, merely arithmetical operations with more magic.

3. *Learning generates more learning.*—A person who does not try to play golf or tennis passes through life without learning these forms of exercise. In some manner a beginning must be made before more is desired and learned. A demonstration, a story, an illustration, or an event may serve to give initial momentum to learning. A deficiency in conversation may start the search to build a background of jokes and information. An assertion that the laws violate a provision of the Constitution may lead to an intensive study of the supreme law of the land. Past experience is useful, but the field beyond experience needs study and investigation. A good introduction to a body of knowledge creates a desire to know more.

4. *Progress must be made to sustain original effort.*—The old maxim that "nothing succeeds like success" is still good psychology. This law of interest means that content must be tuned to individual differences; otherwise the notions of ground-to-be-covered and rigid requirements for credits ride roughshod over the capacities to assimilate content, and failure and disappointment are inevitable. Investigations show that even under ideal conditions there are bodies of content beyond the capacities of many children to master. If schools are made for children, then children should feel the joy of success through content and method suited to their capacities.

5. *Variety fosters interest.*—This law does not mean variety for the sake of variety, but variety for the sake of mental and physical stimulation. Of course, no sacrifice of learning should ensue, but rather an increase in efficiency should result. Debates, dramatiza-

tions, demonstrations, reports, supervised study periods, short lectures and explanations, oral readings, vital discussion, and visual presentations often secure relief from some unvarying practice of conducting class work.

6. *Use of the higher mental processes increases effort.*—Memory work as a steady mental diet soon loses its tang. Learning is a dare, an adventure, a challenge. Something ought to be conquered. Problems, original exercises, applications, verifications, and emotional stimulations should find their places in the program of study. We learn by doing, but the doing should lead to higher processes and objectives. Self-discovery is invigorating; understanding is elevating to the mind and spirit.

APPLICATION EXERCISES

1. If you were limited to two ways of motivating learners, which two would you choose? Why?
2. How effective is competition as a motivating force? Does competition have any disadvantages?
3. What seems to be responsible for the difference between in-school and out-of-school expenditures of energy?
4. Read a few books in educational psychology and list the instincts considered important by the authors.
5. What is the difference between intrinsic and extrinsic interests?
6. Suppose a mathematics teacher were asked by one of his pupils: "I want to know what good algebra will ever do me?" What kind of answer should the instructor make?
7. Examine your learning in secondary school and enumerate the causes responsible for your interests or lack of interests.
8. Is there any past experience one might build upon in teaching these items or topics?

   a) The metric system
   b) Percentage
   c) Air pressure
   d) Archimedes' principle
   e) "The Man with the Hoe"
   f) A rule in spelling
   g) Iambic pentameter verse
   h) Law of supply and demand
   i) Veto power
   j) Collective bargaining

9. Is it difficult to determine whether the interest generated by a teacher comes from *what the teacher is* or from *what the teacher does?*
10. Are dull pupils easier to motivate than bright ones, or is it the other way around? Would the same means of creating interest be equally effective with both groups?

RELATED READINGS

BURTON, W. H. *The Guidance of Learning Activities,* pp. 63–85. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

FREDERICK, R. W.; RAGSDALE, C. E.; and SALISBURY, RACHEL. *Directing Learning,* chap. iv. D. Appleton–Century Co., 1938.

LEE, J. M., and LEE, D. M. *The Child and His Curriculum,* chap. iv. 2d ed. New York: Appleton-Century-Crofts, Inc., 1950.

MURSELL, J. L. *Educational Psychology,* chap. xi. New York: W. W. Norton & Co., 1939.

PRESSEY, S. L., and ROBINSON, F. P. *Psychology and the New Education,* chap. v. Rev. ed. New York: Harper & Bros., 1944.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* chap. xxii. 2d ed. New York: American Book Co., 1947.

SCHORLING, RALEIGH. *Student Teaching,* chap. vi. Rev. ed. New York: McGraw-Hill Book Co., 1949.

SKINNER, C. E., *et al. Elementary Educational Psychology,* chap. ix. New York: Prentice-Hall, Inc., 1945.

SORENSON, HERBERT. *Psychology in Education,* chap. xiv. New York: McGraw-Hill Book Co., 1940.

UMSTATTD, J. C. *Secondary School Teaching,* chap. v. Rev. ed. Boston: Ginn & Co., 1944.

INTRODUCTION

TEACHING out principles is another way of expressing what is meant by fulfilling them. After the principles are understood, procedures are planned to influence learning activities so that the principles are realized. Let us suppose that particular objectives have been selected as most worth while. Setting forth objectives is, however, the fulfilment of only one principle, and other principles are necessarily taught out before the objectives are attained. Self-activity, types of learning, unitary development, and motivation are immediately involved. Providing for individual differences, diagnosing and remedying difficulties, and keeping a good environment for learning are also principles to be fulfilled.

Part III shows how the possibilities in some common classroom procedures can lead to a realization of the principles of teaching, especially the first five. The last three principles are developed in Part IV.

CHAPTER VIII

A TEACHER'S IMPORTANT RESPONSIBILITIES DURING TEACHING TIME

SO FREQUENTLY the study of instruction is concerned with how to do this and how to do that: how to use the project method, how to teach inductively, how to conduct a socialized recitation, how to ask questions, and how to make lesson plans. From this large number of how-to-do techniques the beginner is believed to have an understanding of the work. Charging the mind with numerous methods, it is hoped, will guarantee a supply of procedures, on tap and ready to surge forth almost instinctively at the right time; good teaching supposedly will be brought automatically into being by the pressure of methods from within. This explanation of effective teaching is found wanting. Teaching is basically a problem-solving activity; it is fundamentally the finding of best solutions for those everyday problems confronting a teacher as she labors in behalf of young learners. The principal problem is the giving of time and thought so as to bring about the highest development of pupils.

How can a teacher use the time she has at her disposal to serve the pupils whom she teaches to the best advantage? This problem is so vital that it should be set up as a constant reminder to "Stop, Look, and Listen!" In the final analysis, a teacher is trained for the purpose of working out in her own mind a solution that is immeasurably better than the shoddy solution of an untrained person. Only a limited amount of time can be devoted to or spent with pupils each day, and, consequently, the best disposal of time becomes the perpetual problem to a conscientious person hired and paid to do the most worth-while things for adolescents. More is involved than merely the giving of so much time; unless time brings forth valuable results, it cannot be considered time profitably spent or time truly worthy of the price paid for it.

Learning always the first consideration.—In considering the most profitable use to be made of the time at one's disposal, there

will always be present the bearing of what is done and its influence upon learning. At all times learning should stand firmly in the foreground. To permit it to become a forgotten or neglected or unimportant consideration will bring inefficiency and loss of equilibrium in the solution of best teaching activities. The more one knows about the elements of learning, the more able one becomes in planning and executing during teaching time the processes most influential upon the progress of those who are the recipients of instruction.

Visualize a class of thirty high-school boys and girls taught by some teacher. She has a certain amount of time to teach. Confronting her is the problem of directing learning wisely during this time. What shall be done? Would that someone could answer that question so satisfactorily and scientifically that a course could be charted truly and accurately; but, unfortunately, there are complicating factors in every class which make variations in procedures imperative. About all that an author can do for his readers is to arouse and stimulate and suggest in the hope that such assistance will serve as the beginning and not the end of thinking and planning. Furthermore, in offering such assistance, no particular claims for any one method of teaching will be forthcoming, neither will there be any attempt made to set forth an endless array of techniques. Teachers cannot be made by cramming them with techniques and still more techniques. What will be attempted in the offering of assistance are the arousal of thinking about learning and the drawing of attention and reasoning to the possibilities in the procedures awaiting selection and use in teaching.

Before me is a letter from a high-school principal asking for the best two or three books devoted to the socialized recitation. Difficult it is to fathom the exact purpose in the principal's mind, but a good guess is that some sudden inspiration to improve instruction in his school is the motive. How quickly one is ready to accept some single recommended practice as the cure-all for teaching! No heed is taken of the part the procedure can or will fulfil, no thought of its possibilities is entertained, no sounding of

its bearing upon achievement is ascertained. Something ought to be done, so one course is followed to bring the school into fashion or into the progressive classification. If complete learning and profitable teaching were constantly held up as the guides, no such heedless acceptance of one application of a particular procedure would be considered the one solution for the balanced improvement of instruction in any school. It is the utilization of effective means to produce complete learning that makes teaching good, not the spasmodic use of some spur-of-the-moment device. To be brief, it is the best direction of pupils' energy during an allotted time that makes teaching effective.

Unprofitable use of time.—What can be done during a class period to make learning most profitable? Perhaps the best way to create the proper setting is to view some teaching that is obviously not most profitable. Yesterday the pupils were assigned chapter xix or else pages 105–13 in the textbook just as the bell rang at the close of the period. Today we follow the classroom proceedings through a fifty-minute period:

> "Close your books" is the first sound heard. "Who founded Georgia?" "What was his nationality?" "In what year was Georgia settled?" "What was the first settlement made in America?" are samples of the 115 questions asked. Now and then remarks such as these are made: "Did you study your lesson?" "Remember, last month you got an F, and this month will find you worse off"; "There will be a larger number of failures next time you get your report cards, and don't blame me"; "If tomorrow's lesson is a repetition of today's, there will be a class after school." Between questions some time is found to place a number of daily recitation grades in the teacher's daily grade book. The last one of the fifty minutes finds the teacher saying, "We will have the same lesson tomorrow—remember what I said about a class after school."

An analysis of the proceedings reveals a waste of time in learning brought about by an unprofitable use of teaching time. Pupils in this class were about as far advanced in growth at the beginning of the period as they were at the end. They marked time for fifty minutes because the teaching called for marking time. Marking time is not a forward movement; it is the spending of time and whatever effort is expended in staying in the same

place. No growth is made if time is spent with no semblance of a forward movement. If any progress at all resulted from this teaching, it surely must have occurred outside of class time, and there is little evidence to show that the teacher did anything of importance to facilitate out-of-class activity.

Profitable use of teaching time.—This negative picture serves as the starting-point in focusing attention upon the numerous possibilities a teacher has during her stay with pupils to direct their energies into positive and profitable undertakings.

1. First among the profitable means of using time in teaching is that one which prepares the minds of pupils to look for and seek out objectives. Even though the actual attainment of aims may not begin during the class period, the basis is laid for fruitful activities to operate in the near future. It is during this time that the teacher can give direction to development and growth. One studies better if he is seeking goals. Emphasis can be placed upon the ends of learning. Doing the most to promote achievement is not necessarily done directly and immediately; some of the achievement can be brought about more effectively and economically by setting the stage so that the work outside of class time, or at some future time within the period, can proceed efficiently. For some unwarranted reason, so many persons engaged in teaching or the supervision of instruction hold religiously to the belief that, if a teacher is not pumping and testing to find out what already has been learned, no learning or teaching can possibly be going on. The sooner these persons look to other phases of teaching—to phases immeasurably more vital than the hearing of lessons—the sooner will instruction be raised to higher levels of effectiveness and, likewise, the learning conditioned by that teaching. Let pupils in on their development, give them some voice in planning it, direct their attention to uses and applications and understandings, guide their efforts toward desirable ends, and emphasize what is of great value and what is of lesser importance. The class period is allotted to a teacher in order that learning may be kept moving forward. By moving forward is meant an increase of some kind in the attainment of aims; the aims may be different viewpoints, stronger associations, deeper

meanings, more knowledge, greater skill, new appreciations, or new or more vivid percepts. Whatever the aims may be, there should be some further attainment of them. Class time devoted to these phases of development is well spent.

2. Using time to motivate pupils is another way to increase teaching effectiveness. Getting the learners ready, creating within them a mind-set, arousing their latent energy, and stimulating their desire to want to learn are phases of motivation. One should consider time as well utilized if eagerness to work is generated. Motivation is always indirect; it is the result of other forces. One force that promotes effort is the way new ideas or topics are approached or introduced. For example, approach can be made easy and gripping by bringing in similarities between, let us say, the present and the past or by going from the known to the unknown. The presidential campaign of 1952 will illustrate this approach.

We have lived through a period of American history in which a national military hero, likewise a person internationally known as a great leader, won the election for the presidency of the United States. The country is now faced with many serious problems. There are the problems of Korea, taxation, corruption, communism, high cost of living, labor and management, and relations with foreign nations. We know what the problems are, but we cannot foretell at this time how they will be settled. America needs a strong leader now, and we hope that the President, Dwight D. Eisenhower, is the man to guide this nation wisely in the years ahead.

There was another time in our history when a national military hero was also elected to the presidency of the United States. In fact, this hero was elected as our first President over one hundred and sixty years ago. At that time, too, there were serious problems confronting this country. Since Washington lived in the past, the solutions are known; the future alone will tell how the problems of today were solved. The problems of the past were, most likely, different from those of the present, but they were problems that had to be met. What problems confronted George Washington and the new nation? How were the problems solved?

Approach can be based on the various inclinations possessed by pupils. Use interests, curiosities, experiences, similarities, contrasts, analogies, events past and present, and problematic situations. A pupil who wants to learn is a better learner.

3. Some of the class time should be devoted to unification. This part of learning is difficult for young learners because their minds concentrate upon daily items in their work without thinking of what has gone before or what will come later. Pupils need hints, reminders, and suggestions that will lead to more unity as study progresses from day to day and week to week. They require questions to facilitate organization of and reflection upon separate elements of learning so that larger and more profound structures are formed. Whatever can be united with other information should be merged with it so as to construct broader meanings and understandings. Unity in learning is not easily achieved; assistance coming from a mature person is desirable in the guidance of young learners.

4. Numerous occasions occur in learning when the experiential background of a person is not developed sufficiently to grasp the true meaning of content materials. In such subjects as mathematics, history, science, and literature, percepts are required before understanding of the verbal and printed materials can be secured. At this point class time should be used to provide whatever background of experience is needed. Visual aids, verbal illustrations, recall of past experiences, demonstrations, developmental discussions, specimens, interpretations, and many other types of sensory experiences can be utilized. It is the teacher's responsibility to sense just when the learning is likely to be abruptly interrupted by lack of background; pupils themselves can often judge what is lacking in their efforts to gain the proper degree of mastery. In mathematics, for example, the words may relate to situations in life that are not familiar or even known by the pupils. Let us examine these problems:

A and B working together can do a piece of work in 6 days. At another time they did the same amount of work when A worked 3 days and B worked 10 days. How many days would it take either to do the work alone?

A man has $3,000 invested at 8 per cent and $4,000 at 7 per cent. How much must he invest at 5 per cent to make his total annual income be 6 per cent of his total investment?

It may be that many pupils cannot visualize that elusive concept of work and time. A question such as "What part of the work could A and B do if they worked together at it for one day?" could start a train of thought that would lead to the correct visualization of the conditions needed to solve the problem. The mathematical manipulation should be based on the correct visualization of conditions; if it is not, then the figuring is pure guesswork. How many of the pupils called upon to work interest problems have ever computed interest in a life-situation? Perhaps their only experience with interest has been in make-believe problems in the classroom. Some of these make-believe learnings are never more than airy, vague, verbal, and artificial gleanings barely memorized to get by classroom requirements. Here is another collection of words:

> Daniel Webster said of Hamilton, "He smote the rock of national resources, and abundant streams of revenue burst forth. He touched the dead corpse of public credit, and it sprang upon its feet."

What kind of interpretation would a junior high-school pupil give for the quotation? And you, dear reader, what is your interpretation of "Kites rise against, not with, the wind"? Probably you are beginning to realize that one's background of experience has a direct bearing upon his learning. Class time must be devoted to the building-up of experiential backgrounds whenever there is insufficient inner power to gain meanings from printed or verbal materials.

5. Attention should be given to how pupils study as well as what they study. Back of attainment are the ways one studies. Growth rests upon the processes supporting it, and for that reason constant observance of the methods of work or study of pupils is obligatory. To demand or expect high attainment without regard for the processes supporting the expected achievement is only wishful thinking. Behind every lack in attainment there lurks a cause, and quite often that cause is a poor process. No doubt, time can be devoted most profitably to the building-up of more efficient methods of work, for the better processes will then assist greatly in reaching the ends so highly desired. Now, study is an ability of no small proportions, yet it is assumed

too often that it is an inherited capacity that needs no nurture or that it takes care of itself. The ability to study is acquired, and its development is a responsibility of the teacher. Assistance in this respect runs all the way from direct instruction in how to study to the setting of situations that pull study into the right channels. One studies better if he knows just what should be accomplished; therefore, clear and definite aims give effort proper direction. A person will put forth more effort if he is interested; so, creating a mind-set for study is essential. An overview of a job makes it possible to see where details belong as one labors; hence, the ability to organize and put parts together adds to the efficiency of study. The setting of problematic situations arouses curiosity and discovery; consequently, the problem-solving type of learning rather than the memory type is brought into operation increasing, thereby, grasp as well as retention of learning. There should be no neglect of the processes. Reading, organizing, memorizing, concentrating, recalling, associating, thinking, and evaluating are all specific procedures which must be developed; otherwise the results which depend upon the functioning of these processes will not come forth abundantly, if at all. The teacher who builds these processes into good and efficient habits performs a service of inestimable value. Such service may be the best possible in some of the time available. These are only a few suggestions that could be used by an instructor as the class work progresses from day to day. Build up within pupils the power to study. That power does not come easily to young persons. Assistance by the teacher will pay off in extra dividends when the fruits of learning are measured.

6. Associated with the development of processes is an activity of teaching which has for its purpose the discovery and the removal of troublesome steps hindering or blocking pupils' progress. Another way to convey the same idea is to state that the diagnostic and remedial phases of teaching bear directly upon the achievement of some, or many, or all pupils as their study advances. Assigning a lesson in a careless style, testing to see what pupils absorbed, giving grades, and threatening with low grades or failures are clear indexes of lack of teaching duties

and obligations; moreover, they indicate a weak grasp of the activities productive of true learning. Discovering troubles and difficulties that impede progress and using remedial measures to alleviate them are teaching obligations that require fulfilment during class meetings. While the diagnosis of any particular individual is always desirable, there are many diagnostic and remedial measures that can be applied to the group as a whole. Constant observation of pupils, an inventory of their shortcomings as revealed in written work and oral responses to questions, inabilities to understand or to apply or to see relationships, and their failures in solving problems should invite a search for the causes of as well as the planning of ways to correct the weaknesses common to many or all of the pupils. High-school boys and girls are not renowned psychologists or masters of textbook content; they are only beginners on the road to knowledge and wisdom. Their travel is bound to be rough and beset with obstacles. The teacher who is able to find out what hinders progress and what can be done about it is doing considerable to strengthen learners to go forward under their own power.

7. Lastly, any activity in teaching which bears heavily upon the conditions and circumstances supporting growth should receive the attention of the teacher during the time work in the classroom is progressing. Any activity does not mean anything a teacher may do to spend time, but it does mean any activity which is most profitable per unit of time spent. The criterion used to judge the worth of activity must always be the effectiveness of that activity in producing the kind and amount of learning desired.

The preceding suggestions are intended not to be exhaustive in any sense of the word but to start a train of thought relative to the wisest use of time in directing learning. Ability to use time most profitably can come only in so far as one understands the fundamentals underlying learning and in so far as one judges accurately the teaching activities which bring growth to its maximum possibilities. Learning and teaching cannot be considered separately; they are a unit inseparable. Wise use of teaching time means wise use of learning time.

APPLICATION EXERCISES

1. Student teachers and regular teachers often say after they have been supervised for a period, "I wish you could have been in here yesterday because the pupils responded splendidly. They were regular clams today." Why should pupils change so much from one day to the next?
2. Some teachers encourage the hand-waving practice, that is, after a question is asked all hands are supposed to go up; and, if one or two hands go up, the teachers feel discouraged. What kind of activity is in progress if there is waving of hands by all pupils after each question?
3. In a certain college the professor of history of American education assigned a special topic for every member of the class, and then the rest of the semester was spent in giving reports and listening to reports. Was this professor using class time profitably? Analyze from a number of angles.
4. Is there any relation between the subject and the most worth-while activities in learning that subject? Are effective activities in learning French the same ones that would be effective in learning physics? In what ways might class activities in learning the two subjects be the same? In what ways different?
5. Is listening to a good lecture sometimes a most profitable use of class time? Why is the lecture method frowned upon as a method in secondary schools?
6. Which classroom activities are marking-time activities? Justify the activities selected as poor enough to place under this label.
7. It is often said that some teachers talk too much. "More pupil talk and less teacher talk" is the slogan often uttered by supervisors. Do you believe the slogan has any justification for its existence? Burton, in his *Nature and Direction of Learning*, says that it is easy to have so much teaching that no learning takes place. Illustrate what Burton means.
8. List the useful ways of using class time mentioned in this chapter and tell under which principles of teaching the ways should be placed.
9. In a certain country high school the teacher of civics took her classes to the county seat to see circuit court in session. School board members were very much perturbed and went so far as to say that they were not paying her to gallavant around the country. Could you justify the activity used by the teacher? How profitable was it in pupils' learning?
10. What activities have probably been overworked in classrooms? Which profitable ones have been omitted? Is it possible for learning to go on without the use of textbooks or reference books? Explain.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension Services
CALCUTTA-27

CHAPTER IX

THE ASSIGNMENT AS THE BEGINNING-POINT IN TEACHING

A PARTICULAR text in methods of teaching has lesson-planning as one of the very early chapters. Now, a lesson plan is a finished product. One would be led to think that good teachers could be made immediately by writing lesson plans; on the contrary, the truth is that excellent plans come from well-prepared backgrounds. Plans do not make teachers; teachers make plans. Singers who appear in grand opera show a high degree of perfection, but it does not follow that a person beginning vocal lessons can reach a high degree of perfection just because he sings his first song in grand opera. The making of an assignment is a part of teaching, not the whole of it. The assignment is a logical beginning-point because it is the initial phase of directing the mental processes of others. By building up in the mind a few basic ideas, assignments with merit will come forth. Ideas about the possibilities in an assignment rather than cut-to-pattern techniques in making an assignment will be the major points of emphasis in this chapter.

Assignment often neglected.—In the general run of teaching, the possibilities in the assignment have been neglected, yes, almost forgotten and forsaken. Probably the reason for this oversight of a phase of instruction so latent with possibilities is the oversight of many powerful factors affecting the learning process. Teaching has been too much concerned with testing and too little concerned with the importance of wise preparatory direction for study. So there will always be oversight of vital phases of teaching until understanding goes deep enough to see instruction as an activity which has for its main purpose the intelligent direction of study. And it is the significance of the assignment as an important factor influencing immediate and subsequent effort that must come before the assignment occupies the exalted position it deserves.

POSSIBILITIES IN AN ASSIGNMENT

1. *Objectives.*—First among the possibilities is the opportunity to set forth the objectives. What will I have these pupils learn? What are the most important objectives? These questions must be uppermost during the planning of an assignment. It cannot be expected that immature pupils can select objectives unless the belief is held that any textbook takes care of this responsibility automatically. One would be inclined to think that the textbook does do the selecting, otherwise so many assignments would not be: "Take the next ten pages," or "Take the next chapter. Dismissed!" Teaching obligations should not be shifted so unconcernedly.

In a previous discussion mention was made of a lesson in geography which proved to be defective because the assignment was neglected. Recalling that assignment brings to mind the aims of the class during the period of study. The pupils were to draw maps of the United States, and that is precisely what they did; the maps were accurately sketched and beautifully labeled and colored, but a little investigation found that percepts of shapes, locations, and relative positions were completely lacking. Why? Because pupils thought the maps were to be exhibited as works of art! Their study did not take proper direction, and as a result real values were not stressed and were not even brought into consciousness. Because aims were not set forth, they were not attained.

A Senior in high school was asked if he could tell anything about the Declaration of Independence. His answer was, "I've heard a lot about it, but I can't tell you what it contains." Then he was asked, "Did you ever see it?" His answer was, "No." This incident leads up to an assignment that did leave an impression. The details are supplied in full, exactly as the assignment unfolded in the class:

TEACHER: Suppose you were the owner of a store down in our business section, and you employed a number of clerks, among whom was one girl especially able and capable. One day this clerk came to you, let us suppose, and said, "I'm giving up my job, I'm leaving at closing time today." What would you as the owner do?

PUPIL: I'd talk to her and try to have her stay.

P.: I'd want to know why she was quitting.

T.: Yes, I believe as the owner you would want to know the reason why she was leaving. In all fairness she should at least tell you why. Do you think she should tell the truth?

P.: Yes, it might hurt; but the truth should be told.

T.: There is another angle that needs to be kept in mind. You are the owner of the store and she is a clerk. Do both of you have certain rights, you as the owner and she as a clerk?

P.: The clerk has the right to expect as much pay as the other clerks; she should not work longer hours than the others; she should be treated as a human being and not as a slave.

P.: I think she always has the right to leave if she can get higher pay in some other store.

T.: Would you as the owner have any rights?

P.: Yes, I would expect her to do as much as the others and keep the same hours. I would not have the right to make her do more work or treat her worse than the others.

T.: Now, this case shows that there can be trouble or disagreement between two persons and also that there are rights which each has. We have decided already that the girl should tell you why she is leaving, and she should tell the truth. We don't know exactly why she is quitting, but we do know she has decided to leave. Up to this time our work in history has been similar in that trouble has arisen, not between two persons, but between two countries, the mother-country and her colonies. Tomorrow we shall find that the colonists decide to quit or leave. I wonder why the colonists decide to leave.

P.: I know, they wanted their freedom.

T.: That's it. What other word means the same as freedom?

P.: Independence.

T.: Yes. A while ago you said the clerk in leaving should do a particular thing. Should we expect the same from the colonists?

P.: They should tell the mother-country why they want their freedom or independence.

T.: There is a big word that means the same as "tell." What kind of sentence is it that tells something?

P.: Declarative.

T.: Good! The colonists tell or declare their independence, and we call what they declared the Declaration of Independence. You have already told me that the colonists should give their reasons for leaving or wanting their independence. Do you think they might tell about something else?

P.: They might tell about their rights.

T.: Surely, that's just what they did. It would be interesting to find out just what rights the colonists thought they had.

P.: I'd like to know what rights they had.

T.: I will read a few passages from the Declaration of Independence. (*Reads.*) "We hold these truths to be self-evident, that all men are created

equal, that they are endowed by their Creator with certain inalienable rights, that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed." Would that passage be called rights of men or would we say those were the reasons for wanting to break away from the mother-country?

P.: Those are rights.

T.: Tomorrow, see if you can tell the rights that the colonists declared should be theirs. Of course, you must try to understand what is meant by "governments are instituted among men," "deriving their just powers from the consent of the governed," and other passages in the Declaration. I shall read one more passage: "He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people." Is this a right or a reason for wanting independence?

P.: That's a reason for wanting to break away.

T.: Exactly! You said a few minutes ago that the truth must be told. Is that reason I just read the truth?

P.: Yes, in the Boston Massacre the British soldiers shot down some people.

T.: You have the idea, and for every reason given see if you can figure out just what the writers of the Declaration had in mind. Connect it with the events we have been studying about up to this time. In the back of your textbook is an exact copy of the Declaration of Independence. How should you study that for tomorrow, Henry?

HENRY: Look for the rights of the colonists and the reasons for breaking away from England. Also try to figure out what the writers had in mind when they wrote the rights and reasons in the Declaration.

Standing out in bold relief in this assignment are the objectives. A pupil who does this assignment will never again say that he has heard a lot about the Declaration but that he has never seen it or that he has no notion of its contents.

2. *Mind-set.*—A second possibility is the opportunity to develop mind-set. Mind-set is a factor in motivation, another expression for mental attitude which brings release of energy. Without the proper mind-set one does not have the attitude of a learner. Attitude denotes a state of eagerness to know or to do. To pass over the attitude-producing possibility in making an assignment is to neglect an important factor conditioning learning. Building up this attitude is the best possible use of teaching time because mental-set determines the amount of application made during learning time. After all, it is the learning that shows the effectiveness of instruction.

Heretofore a statement was made containing the idea that much motivation is secured through good teaching. The purpose of all motivation is to produce a state of eagerness or willingness to act. The assignment in the study of the Declaration of Independence produced that state or condition by bearing down heavily upon a familiar human situation which created a desire to know how others confronted with similar troubles or circumstances would react. Practically every learning situation has something in the background or the foreground which can be utilized as a gripping approach to create a favorable mental attitude.

An adage that should find place in pedagogy is the old one: "Well begun is half-done." Getting the pupil agreeably disposed toward his future undertaking is victory half-won. Repeatedly, the principle of right approach is violated in practice by such depressing inhibitions as: "Get this new assignment in on time"; "There will be no excuses for the laggards tomorrow"; or "Get busy now; let's have no repetition of the last horrible lesson." To make school work boring and disagreeable is not an objective of education; enough boredom and disagreeableness will there be without special effort. Learning can be made a pleasure instead of a pain. Any pupil likes to be active, provided he is given half a chance to exercise his mental faculties purposefully. Create in him the right frame of mind; win half the battle by a gripping approach. Approach, with its possibilities in creating the right mental-set, can be further illustrated by introducing that dry phase of English known as punctuation. In this instance the approach will draw heavily upon the use of punctuation.

The traffic cop on the corner shows in person what he wants us to do; he blows his whistle, raises his arm, turns his body, and points with his hands. Each sound or movement means something to auto-drivers; it means go, stop, turn, go slowly. Some devices had to be employed when the cop could not be there in person. Electric signs and printed words and symbols signify, in spite of the fact that no cop is around, that one must stop, go, turn, go in one direction, or go slowly. There would be more broken fenders, loss of property, bursts of indignation, serious accidents, maimed individuals, and deaths if there were no signs or if drivers did not know what the signs meant.

When a person is present, he can convey his ideas by voice or gestures;

but, when he writes, punctuation marks are used to help in making his ideas understood. During World War II, Peter Bowers joined the navy, and his wife, a very religious woman, wanted the congregation to pray for her husband's safety. She wrote a note and handed it to the minister. The next Sunday morning the minister, peering over his glasses, read the note to his congregation: "Peter Bowers having gone to sea his wife, desires the prayers of the congregation for his safety." Mrs. Bowers didn't indicate just where the minister should stop in reading the note, so he read it as he thought it should be or without thinking at all, but by so doing he caused embarrassment to one person and amused the rest of the congregation. Don't blame the minister; the woman is at fault this time; she didn't punctuate, she didn't help the other person to understand what idea she had in mind. The minister read right along at full speed because there was no punctuation sign to indicate a stop.

It is difficult to tell who the liar is in this sentence: "The minister said the deacon is a liar." What do you think about it? How could you let the other person who reads this part of your letter (suppose you wrote it) know who the liar is?

A teacher in a certain junior high school was pressed for time; he could not cover all the material before the close of the semester. There was "Enoch Arden," the beautiful poem by Tennyson, which should be read and appreciated by the class of industrial boys. Would he assign it as compulsory outside work? He could hear in imagination the groans and complaints in anticipation of this line of action. He planned another course of action to be consummated at a seemingly inappropriate time, the last period before Christmas vacation. His intentions were unknown to the boys as he engaged them in discussion about problems of life, including love affairs. Can love for a girl start early? How early? Might two boys be in love with the same girl? Whom should the girl choose if two boys desire her affection? How should the rejected one act? What should he do? What might happen if a husband should be missing for a long time? How many years should she wait? These and other questions were talked over frankly and freely by the boys; there were differences of opinions, of course, but no notions or convictions were ruled out as impossible, improbable, or improper. At this time the teacher handed out copies of the poem, giving each pupil a copy, stating as he did so that here was a story about a problem very similar to the one they had been discussing and that they might be interested

enough to read it during vacation. There were no groans or complaints. The words of the teacher, uttered after vacation, were: "The little school had never seen a better lesson."

One familiar with the poem immediately understands the purpose of the teacher in following the course of action briefly depicted. This example impresses, again, the importance of mind-set as an impelling force acting within pupils; it exemplifies the utilization of a possibility in an assignment for producing an attitude within the learner; it verifies the inference that attitude has a powerful influence upon achievement. It is not necessary in creating mental attitude to embark upon a radical change in teaching procedures, to discard the old for the new, to accept the project method as the master-procedure, or to jump upon some advertised bandwagon. It is necessary, however, to know the importance of mind-set and to understand how to promote it. The essence is all-important, not the form. Good teaching, as contrasted with poor teaching, is not necessarily the doing of entirely different things, but the doing of the same things in fundamentally different ways. Within the assignment, a part common to teaching everywhere, there is a golden opportunity to utilize the mind-set producing possibility.

3. *Directing study.*—The third possibility, and a vital one, is the opportunity to direct self-activity into the most profitable ways of studying the assignment in order to attain the aims. Directing study is the giving of the right kind and proper amount of assistance so that pupils can proceed efficiently on their own powers. The setting-forth of aims and the giving of a clear picture of the achievement desired are helpful and necessary, but, in addition, attention should also be focused upon the mental processes making the attainment of aims possible. At no time should the processes be taken as gifts needing no attention or direction.

The kind of direction can be determined only by knowing the capacities of pupils and the activities needed in a particular learning situation. If pupils are very capable, they will need less direction than that given to weaker pupils, or they will require direction of a different nature. If problem-solving activities are

brought into operation, there is demanded direction different in kind from that used when appreciation activities are the basic ones. The assignment affords a very opportune time to bring forward simultaneously the aims and the most appropriate types of learning.

Study directions such as these would have been extremely helpful to pupils in the geography class who could not reproduce maps after drawing beautiful ones: Study the form of the United States; try to see it with your eyes shut; make a map without looking at the book; compare your map with the real map; note your mistakes; try again; study the map with reference to boundaries, rivers, mountains, and cities; see all of them with your eyes closed; then, without help from any source, draw the United States and place the boundaries, rivers, mountains, and cities where they belong; practice in this way, because tomorrow you will be called upon to draw and locate without any assistance except the picture you have in your own mind. In the history assignment the teacher had pupils attack the problem while in class in such a way that the same process would carry over into the study of the lesson for the next day—pupils were to look for rights and reasons and to figure out just what the writers of the Declaration had in mind while composing that declaration—they were to be moved by the feelings and beliefs and grievances of the colonists as the colonists attempted to meet a real problem.

While observing a geometry class recently, the author witnessed an example of direction which bore down heavily upon the pupils, for in this instance the pupils themselves were the victims of their own carelessness in study. It happened in that phase of geometry involving the proving of triangles equal. Upon the board were placed Figure 9 and the following information: Yes, practically every pupil proved the two triangles equal. One apt boy went to the figure on the board and proved it to the others; and the others, almost without exception, acquiesced assuredly. There was one boy who thought something was not right; he did not know what it was, yet it did not seem right. Finally, one pupil said the problem was impossible, and his reasons were given. The teacher turned upon the apt boy and the

others who acquiesced. "How do you know that $\angle 3$ and $\angle 4$ are right $\angle$s? Who told you?" The pupils squared themselves by saying that $\angle 3$ and $\angle 4$ appeared to be right angles; the lines AC and BD looked perpendicular. "In geometry you can't go by looks, you must have the information given or you must prove it; in this case it isn't given, and you can't prove it; read carefully and think accurately or you will fall into the pit again." Probably no amount of listening to directions could have accomplished so much to set pupils right in their processes of study as did this

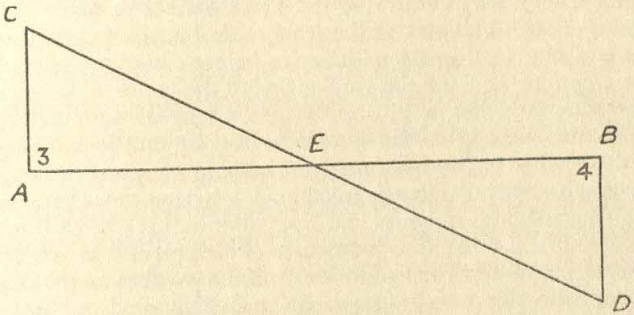


FIG. 9

GIVEN: Line AB with E as its midpoint
$AC = BD$
CONCLUSION: $\Delta AEC = \Delta BED$

short personal experience. These pupils felt deeply the importance of the right methods of attacking the problems for the morrow. It is study of the right kind which produces results; then, time spent in strengthening the most important prop of progress is surely time profitably spent.

Probably the most influential way to direct study processes is to plan an assignment which pulls upon the right mental activities while study is in progress. A list of questions in mimeographed form can be prepared and distributed to supplement oral suggestions. An example of such a list is now supplied to show the objectives desired and the study activities needed to attain them.

AIR PRESSURE AND ITS USES

1. Try to find out why air exerts pressure. It might help you to compare air with water. (Water and its properties and uses were studied previously.)
2. Try this experiment at home tonight. Fill a glass with water and press a piece of paper snugly over the top of the glass. With your hand still pressing the paper against the glass, turn the glass upside down and then take your hand away from the paper. Tell what happens and why it happens. NOTE.—The water will not run out if you are careful in doing this experiment.
3. Read about Torricelli's experiment. What kind of instrument did he use in predicting the weather? What did he in reality construct? Did his neighbors act wisely in drawing the conclusions they did?
4. There is enough material on the work table for you to construct a barometer. Come in after school today or before class time tomorrow and make a barometer. Take the yard stick and the meter stick and find the air pressure in inches and in centimeters. Compare your readings with the pressure readings on the barometer hanging on the wall.
5. Are there other instruments used to measure air pressure besides the mercurial barometer? How is pressure in auto tires measured?
6. From your readings in books and from information gained through observations, make a list of as many uses of air pressure as you can.
7. Those who have time can make a study of the weather map on the bulletin board. Be able to tell how such a map is figured out and what it means. We will have a report tomorrow from anybody who thinks he is able to explain the map.

4. *Unity.*—The fourth idea to be associated with the possibilities in an assignment is the promotion of unity. Assignments covering daily undertakings must necessarily include only a limited portion of a larger understanding, and, consequently, daily acquisitions must be seen as parts of a larger structure. Even in a unit assignment encompassing the work for several days or weeks, there is no law against the giving of daily assistance so that development may be related and unified from day to day. When assignments are given daily, it is always imperative that pupils gain a clear notion of the work completed and the part or parts remaining. This vision gives direction to daily study and leads to the understandng of a significant development in the field of learning under consideration.

The assignment on the Declaration of Independence illustrates the way unity is promoted. While the details immediately pre-

ceding and following have not been included, enough has been given to see the Declaration as the intensification of a struggle between two peoples. The Declaration is one step in an understanding; it is not something unattached or dissociated from what has preceded or what will follow; it grew out of the past and it extends into the future. In every assignment there is present the possibility to organize and unify the learning from day to day and to call attention to relationships that gradually culminate in a skill, idea, concept, attitude, or ideal.

The assignment, in summary, affords an excellent opportunity for the teacher to utilize a portion of her time to the best advantage. The setting-forth of aims, arousing a desire to study, selecting the right processes and procedures to be used during study, and the promotion of unity while learning is in progress are significant possibilities. They can be incorporated into any assignment; they are the fundamentals.

Good judgment to be exercised in details.—Other phases often found in treatments of the assignment will be omitted because these phases should be left to the judgment of the instructor. Such phases as the length of the assignment, when it should be made, whether it should be oral or mimeographed, and whether it should be for a subtopic or the whole unit are to be decided by a good understanding of educational psychology, the psychology of school subjects, a grasp of the learning process, and the consideration of conditions under which the teaching and learning are carried forth. Conditions in some schools are ideal, while in other schools they are the opposite. One cannot expect like procedures to be followed when pupils, library facilities, equipment, and supplies vary so much from school to school. To set forth any definite rules or techniques governing every phase of the assignment might stifle the originality and reflective thinking of a teacher, and to do that would be tragic. If a teacher does not use good judgment in meeting details, then her salvation can be found not in set rules but through a deeper understanding of the fundamental conditions and circumstances influencing the initiation and promotion of learning. He who has experienced true learning will not deviate, or deviate very far, from soundness in

meeting the issues of time, place, length, and form of an assignment. The pull of understanding will help meet these issues intelligently.

APPLICATION EXERCISES

1. Evaluate the soundness of the activities in the assignment on "Air Pressure and Its Uses."
2. An approach to create mind-set is illustrated in the case of punctuation. Make a daily assignment in some phase of punctuation to follow that approach.
3. How would you show pupils that commas in prose writing and quotation marks and commas in direct discourse indicate the same stops that would be made if the ideas were expressed orally?
4. Do assignments have any other possibilities besides the ones given in this chapter? If so, what are they? The possibility of providing for individual differences has not been stressed; it will be treated in a following chapter.
5. At what time during the class period should the daily assignment be made, that is, at the beginning, the end, etc.?
6. Answer Question 5 in terms of psychological time.
7. Which principles of teaching is a teacher fulfilling in making a good assignment? Illustrate.

RELATED READINGS

BOSSING, N. L. *Teaching in Secondary Schools,* chap. xi. 3d ed. Boston: Houghton Mifflin Co., 1952.

BRINK, W. G. *Directing Study Activities in Secondary Schools,* chap. iv. New York: Odyssey Press, 1937.

BURTON, W. H. *The Guidance of Learning Activities,* pp. 336–48. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

FREDERICK, R. W.; RAGSDALE, C. E.; and SALISBURY, RACHEL. *Directing Learning,* chap. xi. New York: D. Appleton–Century Co., 1938.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* pp. 306–402. 2d ed. New York: American Book Co., 1947.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* pp. 175–89. New York: Appleton-Century-Crofts, Inc., 1948.

RUEDIGER, W. C. *Teaching Procedures,* chap. xx. Boston: Houghton Mifflin Co., 1932.

THUT, I. N., and GERBERICH, J. R. *Foundations of Method for Secondary Schools,* chap. vii. New York: McGraw-Hill Book Co., 1949.

YOAKAM, G. A., and ROBERT, R. G. *An Introduction to Teaching and Learning,* chap. iv. New York: Macmillan Co., 1934.

CHAPTER X

THE UNIT CONCEPT OF PLANNING AND TEACHING

On August 3, 1492, Columbus sailed westward from Palos, Spain, and on October 12 he landed at a little island in the Bahama group. In 1620 the Pilgrims went ashore where the town of Plymouth now stands. The Puritans landed on the shores of what is now Boston Harbor in the year 1630. William Penn arrived in his new province in 1682—Pennsylvania at that time was a vast forest and rightly deserves its name. George Oglethorpe founded Georgia in 1733.

THE above sentences contain a few facts about people, places, and dates. How important are these facts in themselves? What meanings do they have? Will they make one a better citizen? Do they help one to appreciate our heritage?

These facts are merely parts of a larger concept of the early or Colonial period of our present nation. The motives of the Pilgrims and the Puritans and the early settlers, the forces driving them to the New World, the convictions that men live by, the sacrifices that men can and will make for ideals, and the contributions to American life made by the colonists are elements which should be related and welded into a unified understanding. Out of this larger and more meaningful whole will come changes in pupils more significant than the mere gleaning of a few isolated and fragmentary items of American history.

Unity implies that the parts should merge to form some whole. Parts are often facts or bits of information which by themselves, separate and unrelated, never find their place in larger concepts, generalizations, and learning structures.

Unity involves the building of more significant realtionships and meanings. It involves the gaining of wider and deeper associations, interrelationships, and applications until the desired growth in some significant aspect has been achieved.

Routine not the essential.—As soon as a new idea in teaching emerges, some persons busy themselves by analyzing, dissecting, synthesizing, classifying, and finally giving the precise steps to

be followed in order to put the new idea into operation. Then, of course, teachers tend to retrace these steps without understanding them. No wonder teaching frequently becomes mechanical and routine in nature. Specifications for units, kinds of units, lengths of units, construction of units, criteria for judging units, evaluation of units, and steps in teaching them are samples of advice given to beginning and experienced instructors in learning to teach by the unit concept.

In this chapter an attempt will be made to generate an understanding of the unit, any unit, and this background should furnish sufficient power for any intelligent person to carry on without following slavishly and mechanically every specific step in the selecting, planning, and evaluating of units or unit teaching.

Origin of unit.—The word itself implies unity. There must have been learning preceding the idea of unity that was not unitary. Progress comes when given conditions are not satisfactory and improvement is desired. What were the conditions making it possible for the concept of units and unit teaching to gain headway? In other words, what was there about learning that was not satisfactory?

Much dissatisfaction was found in the daily textbook assignment because it violated continuity and organization in pupils learning. Each day's work was an entity, separated from the preceding and following study. As a result, facts and bits of information were the ends of daily preparation. The use of facts and information in the development of a real structure of learning was not a conscious guide in mental operations. Teachers finally sensed the futility of making encyclopedias out of young minds. Some way had to be discovered which would produce more meaningfulness than the sketchy and fragmentary daily assignments. How often pupils excused themselves from study because they were not present to get the assignment is beyond calculation. There was nothing to do, nothing to read, no problem to reflect upon, no guide to direct self-activity. The pupils were helpless and inactive unless someone specified exactly what had to be done and what had to be completed by tomorrow.

The preceding weaknesses in educational practice naturally

led to research for corrective measures. Why do pupils believe that memorization of facts is the purpose of learning? Why do they find themselves helpless if they are not on hand to copy down the daily assignment? Why are they not conscious of the end of their reading, writing, and figuring? Why do they not realize in what respects they are endeavoring to make more useful persons of themselves? Must they travel along aimlessly without knowing their destination or how they will get there?

Unit learning had its inception basically in the search for more vital objectives and in the increased knowledge of the learning process. Objectives shifted from facts and dates and provisions as entities in themselves to reasons, developments, understanding, and insights; mental gymnastics gave way to abilities to think and powers to build meaningful wholes. Simultaneously the knowledge of learning brought forth the effectiveness of learning by solving problems, sensing of causes and effects, seeing of relationships, and developing coherent structures. Fortunately these two forces—better objectives and better learning—had a resultant power greater than either force acting alone would have had, and it produced a surge that had to bring a change in classroom practice. The unit of learning and the unit idea in teaching were changes incorporated in classroom instruction.

An experience in unit learning.—Why would one want to teach by the unit procedure anyway? No one would want to unless he had good reasons for doing so, unless he really believed it was a better way to guide learning toward the attainment of some worth-while objective. Let us investigate the reasons by living through a unit as it might develop in one's mind. Forget about teaching; be a learner for awhile.

The United States is a big country with a population of 160,000,000. This is a large group of persons, and it is natural for this group to work together in order to secure advantages that an individual could not, as one person, have for himself. In fact, one person could not possibly have these advantages without group effort. Mail is to be delivered, millions of men are needed in time of war, and national parks are to be provided for the benefit of hundreds of thousands. These and many more are benefits that only all the people working as a group may secure.

This country is composed of forty-eight states; each one is a group with-

in the large national group. Some of these states are larger than many countries in other parts of the world. Within these states many kinds of work must be done for the people residing in them. There are schools to be provided, roads to be built, parks to be established and maintained, and institutions to be provided for the blind and the feeble-minded. This group within a group has problems of its own that are not or need not be settled by the national group.

Within the states are counties or subdivisions of still smaller groups organized politically in order to perform some services needed by these groups. Such services are more personal and immediate than those done by the larger groups. Licenses are to be secured, the poor must be housed and fed, and the courts must hear cases and settle disputes.

At last comes the local group. The town, borough, or city is the geographical name given to this group of persons. Within this group will be needs for schools, fire protection, police protection, recreation, and numerous other services.

In these cases the group acting collectively does work that an individual alone cannot do or cannot do effectively. Some of this labor must be done by the largest group, while other parts are performed by smaller groups. Actually, an individual is quite helpless acting alone. An individual cannot carry a letter to a friend a thousand miles away; he cannot protect his house against fire effectively; he cannot provide police protection for himself and family without tremendous cost; and he is not able to make streets and roads upon which to drive his automobile. Surely these services and advantages secured for everyone through group action make life worth living and make life more abundant and safe and enjoyable.

But here is the crux of these advantages and services: somebody must pay for them. Where does the money come from? You are right! Taxes.

Do you help pay for all the services performed by the groups all the way down to your local community? If you do not, do your parents, relatives, or your friends? You may be surprised to know that you do pay either directly or indirectly.

We need the services mentioned, probably more or even fewer in some respects, but we at least know why taxes are necessary.

Who decides for what purposes the money will be spent and how the money will be raised? In other words, how will the money be spent and who will pay the taxes?

This leads to the work of Congress, the state legislatures, county boards, and local governments. Representatives of the people in the various groups decide such questions. Occasionally the people vote directly to decide issues related to taxation.

From what sources are taxes derived? The national group through its representatives at Washington has such sources as the income tax, corporation taxes of various kinds, taxes on imports, numerous indirect taxes on cigarettes, gasoline, liquor, admission taxes for movies and sports, the postage-stamp charge, and many other sources. How much does it cost to run the national government for one year and for what particular purposes

is the money from taxes spent? States likewise through their representatives in the state legislatures raise money through taxes and spend it for state purposes. The local community also has agencies or boards or councils that levy taxes and spend the money. Local school boards in many states have the power to decide how much money will be needed for educational purposes. Indeed, the tax problem is complex and extensive.

It might be a worth-while undertaking to figure out how much a family in the average community pays out in the way of taxes in one year. If the family lives in a house and owns it, there will be a tax—a property tax—on the house. Then the father may be required to pay an income tax to the federal government and probably another one to the state. There will be taxes on articles purchased, such as cigarettes and gasoline. Probably in some communities there is a sales tax. Will some individuals or families pay more taxes than other individuals or families. Why?

It surely must take many persons to collect all the taxes, to keep the money, to pay the bills, to keep books and records, and to notify taxpayers. Who pays all these clerks, assessors, and collectors?

What is the national debt at this time? How will the principal and interest be paid? Are you in favor of a large navy and army and air force in times of peace? Your taxes will be higher if we have them.

How much money does your community spend each year? For what purposes? How much of the tax dollar goes for schools? Fire protection? Police force? Public library? Should more money be spent for public education? For new schools and increases in teachers' salaries? If you are in favor of these changes and other improvements, the taxes will be higher.

You will be a taxpayer as long as you live. As a good citizen you will study the problem constantly and use your influence to elect honest men and women to represent you in Congress, your state legislature, and your county and local governments. You will have some voice in determining how the taxes will be raised and for what purposes they are spent. Your welfare and the welfare of your fellow-citizens will be determined in great measure by the watchfulness exercised over the purse strings. Our needs and wants are numerous, but, to satisfy them in part or whole, we must pay out of our own pockets or pay collectively as members of a group.

If you studied this unit for the purpose of deriving a general concept of taxation, not minute details, how would you feel at the conclusion? The aim here is some realization of what happened to you while the study was in progress and after it was completed. In other words, what did you learn? You will probably say that these objectives were attained:

1. An appreciation of the work that all divisions of government must perform, because an individual is helpless acting alone and the groups must act collectively for the welfare of each and all.
2. An understanding of why there are needs to be met for the national

group and for the smaller and still smaller groups that compose our society.
3. Why taxes must be levied and collected in order to meet the needs.
4. A broad and general grasp of taxation from the federal government down to the smallest unit of administration.
5. A change in attitude toward taxation; away from the nuisance feeling to the necessity belief.
6. Functional knowledge and information in connection with taxation.
7. Taxation as a social process in which the welfare of all groups and individuals is basic.
8. A framework to which all future knowledge and information about taxation can be added so that the structure of understanding can be supplemented and enlarged.

How did you learn? You will probably say that:

1. Learning progressed toward an awareness and understanding of a central problem or unit of social endeavor in the United States.
2. There was the sensing of relationships and a strengthening of these through personal applications to daily life.
3. Classification and organization were possible and necessary.
4. Reasoning was a major activity; causes and effects were figured out.
5. Appreciating the value and need of taxation was always present.
6. Better retention of facts and general truths was evident.
7. Better study resulted; all reasoning and reading were directed toward a conscious and significant outcome.
8. It was interesting to work on a problem that had man-sized proportions and implications.
9. Different phases of the unit permitted everyone to investigate particular areas that appealed to his interests.
10. The large problem had unlimited possibilities for more study and investigation for each one, no matter how much capacity he had.

Why should one want to teach by the unit procedure anyway? This question was asked before, but you are in a better mental condition now to answer it. Just one answer seems logical, and it is: *because better learning takes place.* If that is not the right answer, then there is no justification in teaching by the unit procedure.

UNIT PLANNING AND TEACHING

1. *Purpose of unit basic in planning.*—It is the unit purpose that precedes all other consideration. How futile would educational effort be unless attention was focused first upon what progress pupils were to make. If perspective be short and vague as to the fundamental outcome in terms of pupil development, then the employment of devices, techniques, and means must neces-

sarily be aimless and haphazard. The purpose of the unit in thinking and perspective must be firmly and deeply intrenched before any other factors are considered.

Quite often the reverse process of working on means occurs before there is crystal-clear thinking about the culminating end of learning. When this happens, any planning, whether daily or unit, becomes merely the listing of pages to be read, problems to be solved, and exercises to be completed. Faith in the custom that if enough activity is meted out something of value is sure to emerge must not persist. One arrives at his destination only if he knows where he is going. Actually, learning is a kind of travel in this respect. Each step in the activity of learning must be guided by the whereabouts of the destination, otherwise the energy expended results in little or no progress toward the objective. Unit planning, therefore, has its beginning when the purpose of the unit is being thought out.

In unit planning the idea of objectives drifts away from mere memorization of so much material, or of a required number of pages or chapters to be covered, toward the development of significant understandings, appreciations, attitudes, insights, and concepts. Morrison did more than any other man to interpret units, and from his excellent book a quotation pertinent at this point is given:

> Teachers sometimes make the mistake of centering their thoughts upon the question, "What shall I include under this unit?" or "What are the minimal essentials of the unit?" Either question implies the table-of-contents notion of study material and the dominance in the teacher's thinking of the information-to-be-remembered stereotype. The question which suggests the right conception of the nature of the unit and its assimilative material is, "What material shall I focus upon this unit in order to bring about the appropriate understanding?" In response to the first question, we may indeed get minimal essentials of information which grouped together constitute a chapter. In response to the second question, we should get a series of *elements of intelligibility,* grasp of which, first in order and then in their interrelationships, constitutes the unit and generates the understanding sought.[1]

A quotation from E. C. Fontaine is also relevant:

> The fundamental characteristic of the Morrisonian "unit concept" is that the subject-matter materials must be organized by the teacher in such a

[1] H. C. Morrison, *The Practice of Teaching in the Secondary School* (Chicago: University of Chicago Press, 1926), p. 178.

way as to make them capable of being *understood* rather than capable merely of being *remembered.* That is, the end-product, from the standpoint of educational results to the pupil, should be a series of understandings and not merely the possession of a mass of factual material. It is easily conceivable, for example, that a pupil may present an uninterrupted series of satisfactory "lesson-performances" on the colonial period or the westward movement in United States history, and yet have at the end of the study of such a topic nothing more than the memory of a mass of facts. That the pupil has not acquired a real understanding of the topic, that he has not gained "an attitude of intelligence" on the whole matter, acquired through his perception of relationships between one set of facts and another set of facts, or between a set of minor facts and a more important fact or movement, is due to the teacher's course in organizing the material in the beginning on a purely topical or factual basis. The teacher did not have understandings, or attitudes of intelligence in his own mind as an educational end-product when he began his teaching of the period or movement. He was satisfied if the pupils merely learned (memorized) the more important facts bearing on the topic.[2]

It might be beneficial at this time to illustrate in a general way what is meant by understandings and attitudes of intelligence as used in the two previous quotations. Our illustration will be taken from history. The author has frequently observed teachers who treated the shortcomings of the Articles of Confederation as sufficient unto themselves. These Articles were distinct and separate from every other phase of historical development, unrelated to anything that preceded or followed. Gradually history began to be viewed in a different light; history became not the rote memorization of countless facts but the unfolding of causes and effects, the appreciation of struggles for better conditions, and the culmination of forces and motives into courses of action. A teacher who viewed history as the unfolding of the past would not be satisfied with a study of the Articles of Confederation as sufficient in themselves but would treat them as building material in the mental grasp of a larger learning structure. She would select the understanding of a significant and coherent historical development as her aim, and that development in this particular case might well be: "How Did the Thirteen Weak and Independent States Weld Themselves into a Strong and United Na-

[2] "The Unit of Teaching," *Educational Administration and Supervision,* January, 1932, pp. 21–22.

tion?" This particular time in our history is often called "the Critical Period."

An examination of the understanding that should be secured during the study of this period in American history will show why units of learning lead to this end much more meaningfully than if the fragments are studied as separate entities. The whole series of causes and effects at work in the period from the close of the Revolutionary War to the time when Washington was sworn into office as the first president should be seen by a pupil; the sequence of events should be in his mind; he should discover the forces at work and how the forces led to a particular sequence of events; he should see conditions making some kind of action necessary, what sort of action was taken, and how the solution was carried out; he should discern these states in the make-or-break stage; he should see human beings working out their own salvation. When a pupil has finished the study of this unit, he will have an understanding and appreciation of a critical era in our nation's life—namely, its struggle at birth. There will be no fragments scattered about, disconnected, and meaningless, but there will be a developed, coherent, and well-grounded concept.

There is nothing mysterious about a unit; it is the result of educational engineering by a teacher or by the teacher and pupils thinking together. In many instances pupils can assist in their educational growth, but in every case the teacher is directly obligated to see that effort is expended wisely and profitably.

A unit is a section of educational development that can be attained better by striving at all times for that final growth than by getting little parts one at a time that may be incoherent, isolated, fragmentary, and meaningless. At times the growth during the study of a unit may be a coherent whole within a subject, such as history, mathematics, or science; again it may be proficient social conduct, such as getting along with people or the treatment of minority groups; it may be a historical sweep of some problem, such as transportation or the rise and growth of democracy; occasionally it may be such a problem as delinquency, conservation, or safety education; or it may be the develop-

ment of a skill or an appreciation, or any human development, physical, mental, moral, emotional; or it may be a combination of all of them. Attempts to classify units into kinds is wasted effort; the purpose of the unit in terms of growth desired is the important consideration.

It must be remembered, however, that the unit concept implies unity. The development is in terms of what happens to pupils; it is their development that should shape up so that it becomes coherent and whole, not serial and fragmentary. And that development is expressed in understandings and concepts and abilities that have greater width and depth than spotty and isolated bits of growth would produce. In the final analysis, the unit concept is a vision of development in human beings.

2. *The view.*—Eventually the time arrives when the teacher must teach out the unit, that is, after she has a clear notion of the purpose of the unit in measures of human development. Of course, the learning necessary to foster that growth is also known, but the emphasis now will be placed on getting pupils to realize what educational journey is to be undertaken. Pupils, as well as the teacher, must get a vision of the contemplated achievement.

Before making a journey into a relatively strange territory, a person naturally wants an approximate notion of the nature, direction, and purpose of the journey; likewise, in starting on a journey into strange learning territory, a person desires a mental view of the journey. The same preliminary urge is there regardless of the length of the mental journey; but, the longer the journey, the more time it takes to gain direction and purpose.

The view in unit instruction is for the purpose of making the learners aware of the basic problems and issues and developments, the grasp of which lead in due time to the central and deeper understanding of the unit. The view is intended to give perspective in learning, to set forth the final understanding to be gained; it is not intended to supply detailed materials needed in working toward the appreciation, the understanding, the insight. When the learner has visualized the problem, when he knows what he is to acquire, the purpose of the view has been fulfilled. What follows thereafter is a matter of study, but how much more

pointed and discriminating that study becomes when the achievement expected stands out in clear perspective!

Some authors call the view a "preview," while others call it the "introduction," but more significant than a name is the purpose. The purpose in a daily view is quite obvious, and, by placing one's self as a learner in preparing the assignments thus far given, the bearing of the view takes on personal significance. When the view covers a unit, the view must necessarily be broader in scope and less detailed, but, even so, the main purpose holds with equal vigor: The mind of the learner is being prepared to see what major development lies beyond to be studied and understood.

3. *Giving the view.*—After the view has been carefully thought out, the next step is the selection of some effective way to have pupils obtain the view. Obviously, the teacher is the only one who has the view; hence, she must be responsible for presenting it. From the nature of the view, it seems reasonable to assume that it would be oral, a conversational and informal discussion, because the development and its direction and difficulties can then be treated simultaneously, thereby assuring a better perspective by the pupils while the view is in progress. At times the teacher may present much or all of the view herself; however, if pupils' knowledge and ability warrant, she should have the pupils participate during the presentation of the view. Pupils are often able to give good suggestions, add new information, offer valuable contributions, and propose possible solutions. By stimulating pupils to recall past experiences, to make associations with other units, and to see the bearings of events preceding and following, a greater degree of interest and appreciation is created in connection with the new unit. During the view the sequence, historical development, cause-and-effect relation, and emphasis can be added or regulated so that the best possible development of the view results. At the end of the view pupils can be called upon to summarize and to review the view; by so doing, their understanding can be tested, and, if omissions or wrong interpretations are discovered, further stress may be placed upon those phases which are vague or have been missed. In the last analysis, the

view is to make pupils aware of the issues and problems, not to learn detailed solutions. When this awareness has been gained, pupils are ready to study the materials or perform the activities needed to secure a better comprehension of the unit under consideration.

Probably no two persons would agree perfectly as to the best approaches in presenting or developing a view; however, it may be fortunate that they do not, because honest differences of opinion often add variety and life to teaching. Immediately following is the approach used by a junior high school teacher in giving the view to a unit already mentioned: "How Did the Thirteen Weak and Independent States Weld Themselves into a Strong and United Nation?"

TEACHER: If a person lived alone on an island, would he get into trouble?

ANSWERS: If he did get into trouble, he would get into trouble with himself, and he would have to get out of trouble himself. He couldn't blame somebody else.

T.: Under what conditions do troubles arise between two persons?

A.: Pupils proposed a number of conditions including possession of something that the other one wants, jealousy, greed, taking advantage of the other, stealing, abusing the other one, and gossiping.

T.: How are the troubles settled?

A.: Answers given suggested fighting it out, going away or parting company, taking the case to court, compromising, and getting a third person to decide.

T.: Is it possible for two or more nations to get into trouble?

A.: Answers included troubles over land, trade, freedom of the seas, and invasion.

T.: How do nations settle their difficulties?

A.: Pupils mentioned among other solutions the following: go to war, make a treaty, pay money, compromise and be friends, take land, and give apology.

T.: Suppose the two persons we talked about wanted to be sure that the other one would live up to the agreement made, that is, if they decided to settle the trouble without fighting it out, what could they do?

A.: Making a contract, getting witnesses, swearing on the Bible, and giving a solemn promise were mentioned.

T.: What would two nations do if each one wanted to be sure that the other would keep its word or live up to the agreement?

A.: Make a treaty.

T.: Suppose thirteen boys meet on a vacant lot or field and decide to play ball. Some of the boys are big and some are small. Is it likely that these boys will get into trouble?

A.: The biggest boy might want to bat all the time. The little boys might have to chase the batted balls all the time. A big boy might say he is safe when he is out and that a strike is a ball. The little boys might get punched if they say too much. There might be a lot of cheating.

T.: What could be done to make the game work right?

A.: Get a rule book and make everybody live up to the rules. Get a strong man for an umpire. Give every boy the same chance to bat, pitch, and play the other positions.

T.: Suppose the thirteen states in their dealings with one another get into difficulties; what might they do?

A.: Agree to some fair rules, make changes in the government, have some soldiers to enforce the rules, and give each state the same rights as any other state were solutions proposed.

At this point the teacher began to present the unit. She compared the states with the thirteen boys, and said that conditions in the states were becoming worse and worse, serious troubles were arising, some of them leading to the verge of war. She related how the thinkers of the time felt deeply concerned. Something had to be done or the relations among the states that had fought side by side for their independence might become more bitter and critical. Washington said, "Something must be done or the fabric will fall; it is certainly tottering." European countries looked this way with eyes filled with territorial ambitions. They would not make treaties with the states, and England held land and forts that she promised to return in the treaty. Something had to be done to improve the affairs of the country. Several of the states had agreed among themselves to band together, but the thirteen as a whole had never been on the best terms. She went on to say that men chosen by the different states met in Philadelphia to talk matters over. Little Rhode Island was reluctant, and wouldn't send delegates. These men talked, debated, made propositions, disagreed, and almost broke up the meeting, but after several months they ironed out their difficulties and agreed upon a few rules that all states should fulfil. These rules of good conduct were carefully worded and printed, and we know these rules and regulations as our Constitution. It took several months of preaching and pleading before the states finally decided to agree to the rules, but at last they did. That set of rules is still lived up to in this country. In summarizing, the teacher again gave the scope and character of the problem and pointed out again that it was first necessary to know what difficulties there were and how these troubles were to be worked out and settled by the agreement known as the Constitution, and what the states did before they finally accepted the agreement formulated at the meeting in Philadelphia.

No attempt is made to leave the impression that presentation of a view should conform to a particular pattern. There is no one best way. The view presented is merely illustrative. "From a

lighted candle a thousand others may be lit without diminishing its flame."

4. *The unit assignment.*—It may take a week or several weeks of work and study before the purpose of the unit has been achieved. Two vital phases of classroom activities during the development of the unit are: (1) a constant emphasis of the objectives and (2) the kind of learning activities that lead most economically to the attainment of these objectives. Since these two go forward simultaneously, they will be illustrated as a pair as they relate to the Critical Period, of which a view has already been given.

This part of the development is known as the *unit assignment.* In the assignment are expressed orally or in writing the objectives and the learning exercises that lead to the attainment of the objectives. We shall assume that the teacher has thought through this assignment carefully, has worked out her objectives and learning activities, and has had the assignment printed or mimeographed so that a copy can be given to each member of the class.

UNIT IN AMERICAN HISTORY

The Critical Period

HOW DID THE THIRTEEN WEAK AND INDEPENDENT STATES WELD THEMSELVES INTO A STRONG AND UNITED NATION?

The colonies were separate geographical and political areas from the founding of Virginia in 1607 until Georgia was settled in 1733 and remained so until 1776—a period of 169 years. Of course, since these thirteen colonies and afterward states were side by side, there would grow up certain interests in travel, trade, and communication. Before and during the Revolutionary War there were occasions when some degree of united action was necessary; the waging of the war itself called for effort beyond that of one colony; the Continental Congress was an agency set up to secure common political action by all. After the war the thirteen states were independent of the mother-country; they had to work out their own salvation either alone or jointly with some or all of the other states.

A STUDY OF THE CONDITIONS

This period in our history was critical because so many events might have happened which could have made big differences in the later history of our country.

1. What might have happened?
2. Were there any forces acting in the direction of unity among the states?
3. Were there any forces tending to separate the states?

The troubles between and among the free and independent states are very serious at this time. In your study find out what conditions existed which caused friction and bitterness among the states.

Your first study should, therefore, be centered upon this aim: *To know and understand the conditions which made the leaders believe that changes were urgently needed if the thirteen states were to become united and strong.*

It will help to classify the conditions under trade, financial, industrial, social, political, transportation, slavery, education, and foreign relation headings. Your awareness of these causes of friction will help you immensely in your future study because people generally try to improve what they have; that is, progress is a change for the better; it is an effort to remedy present faults or weaknesses.

In your readings you will find that considerable stress is placed upon the weaknesses or shortcomings of the Articles of Confederation. How ideal it would be if everything could be perfect from the very beginning! Watch for the motives and beliefs which must grow and get into the minds and souls of men before faults at one period of human evolution are changed and strengthened at a later time. Nations must learn as well as individuals.

The Articles of Confederation were not adopted until 1781. In 1777 the Continental Congress had agreed to the Articles which provided for a new political union known as the "United States of America."

1. What caused the long delay before the Articles were finally adopted?
2. What powers did the Articles give to Congress?
3. Who or what possessed the powers not given to the Congress?
4. How many votes were required before any measure proposed in the Congress could be considered legal?
5. Trace the problems that the Congress tried to meet and the success it had in meeting them.
6. What was the Ordinance of 1787? (This ordinance is considered the one great achievement under the Articles of Confederation.)
7. In general, do you think the government under the Articles was the answer to the political, economic, financial, commercial, and foreign relation conditions faced by the thirteen states at that time? Be able to give good reasons for your conclusions.

MOVEMENTS FOR A STRONGER GOVERNMENT

Men of vision began to be worried over the chaotic state of affairs; they could see thirteen weak little nations stretching out along the Atlantic coast rather than one nation united and strong. Could anything be done to start a movement for a strong union of all states?

1. Mount Vernon conference
2. Annapolis convention
3. The Philadelphia convention, May, 1787

a) Who issued the call for this convention?
b) What was stated as the purpose of the convention? (Keep this answer for future use.)
c) How were the delegates chosen?
d) Mention some of the delegates who assembled in Philadelphia. What can you say about the ability of the group as a whole?

THE CONVENTION AT WORK

It would be expecting miracles to believe that a group of men such as these would have the same beliefs or would see eye to eye on all proposals. What makes men think differently?

During your study keep these two general aims in mind: First, *what proposals were made to strengthen known weaknesses so that a stronger federal government could be formed?* Second, *why were certain proposals rejected while others were finally agreed upon?*

1. Into how many departments was the government to be divided? (Keep copy of Constitution handy for ready reference.)
2. The legislative department:
   a) Of what should Congress be composed?
   b) How many lawmakers should there be, and how were they to be chosen? (This solution is known as the "Great Compromise.")
   c) Were the small states particularly concerned about the basis for selecting or electing members of Congress? Why?
   d) What were some other problems that had to be settled by compromise? (Benjamin Franklin believed that half a loaf is better than no bread. He was influential in bringing about compromises in the convention.)
   e) Were the delegates at the convention firm believers in democracy, that is, did they believe that the rich and the poor, the bright and the dull, the woodcutter and the businessman, the farmer and the lawyer, should be given equal participation in government? What evidence do you have to support your position? (Look for more evidence as you study.)
   f) What powers were given to Congress? Take a few of these powers and and show that they were conferred upon Congress to correct weaknesses of the past. For example, Congress was given the power to declare war. What experiences did the delegates have with wars and those who declare wars?
   g) Why were the states very much concerned about the powers given to Congress? Why were these powers restricted or limited?
   h) Were any restrictions placed on the powers of the states?
   i) In what ways were laws to be enacted by Congress? Are these ways better than the way found in the Articles of Confederation?
3. The executive department:
   a) What weakness in the Articles was corrected by the provision calling for an executive department?
   b) How was the chief executive officer to be chosen?
   c) What powers or duties was the chief executive to have?
   d) Why did the members of the convention set the term of this officer as four years? Why did they call him "president" rather than "king"? Did they figure out some way to prevent a misfit or incompetent President from holding office even for his four-year term?
4. The judiciary department:

a) What purpose was the judiciary department to serve?
b) Why were the judges to be appointed for life or during good behavior? What might happen if a judge's behavior was not good?
c) What was to be the highest court in the land, and how were the judges in this court to be chosen?

5. General provisions and considerations:
   a) Read the Preamble to the Constitution. Is the Preamble a good statement of the need or necessity for the change from the Articles to the Constitution?
   b) Was there any way to meet or provide for new or different conditions that might arise in the future?

THE STRUGGLE FOR RATIFICATION

After the Constitution was drafted it had to be ratified by a certain number of states. Remember that the convention was called to make necessary changes in the Articles of Confederation.

1. Do you think the Constitution consisted of merely a few changes in the Articles or an entirely new document? Support your decision.
2. Describe the steps that were to be taken in the ratification of the Constitution.
3. Was ratification an easy and orderly process? Who were for and who were against acceptance of the Constitution? What did these men say?
4. Who were the Federalists? The Anti-Federalists?
5. By July, 1788, eleven states had ratified. Why did Rhode Island and North Carolina refuse to come into the new organization?
6. William Gladstone, the famous English prime minister, said of the Constitution:

   "I have always regarded that Constitution as the most remarkable work known to me in modern times to have been produced by the human intellect, at a single stroke (so to speak), in its application to political affairs.

   As the British Constitution is the most subtle organism which has proceeded from progressive history, so the American Constitution is the most wonderful work ever struck off at a given time by the brain and purpose of man."
7. As an American citizen, what do you think of the document formulated at the Constitutional Convention in 1787?

INDIVIDUAL PROJECTS

1. Read accounts of the ideas expressed by famous American leaders in favor of (Alexander Hamilton, James Madison, John Marshall) and against (Patrick Henry, Richard Henry Lee, Samuel Adams) the ratification of the Constitution.
2. Make a study of the amendments to the Constitution putting special emphasis upon the reasons for adding the amendments.
3. Make a study of the actions of Rhode Island and North Carolina during the framing and ratification of the Constitution. Why did these states delay so long and why did they finally join?
4. The Constitution is considered a system of checks and balances. Why were these checks and balances thought necessary? Enumerate as many of them as you can find in the document.

5. It is said that the delegates at the convention were afraid that the radical, propertyless, and irresponsible element of the population might get control of the government. Are there any provisions in the Constitution that would make this gaining of control difficult? What are they?
6. Relate the part played by either James Madison or Benjamin Franklin during the convention.
7. "The Constitution is the supreme law of the land." Explain the meaning of this statement. Illustrate by concrete examples from some recent American history.
8. Today, in connection with the United Nations, we hear much about sovereignty. What is your understanding of this idea? Since the states gave up part of their sovereignty to form the United States, do you think it would be wise and proper if the nations today would give up some of their sovereignty to form a united world?

REFERENCES

Barker and Commager, *Our Nation*, pp. 135–64.
Beard and Beard, *The Making of American Civilization*, pp. 157–87.
Dorf, *Visualizing American History*, pp. 28–33.
Dumond, Dale, and Wesley, *History of the United States*, pp. 181–90.
Faulkner, *America: Its History and People*, pp. 103–61.
Forman, *Advanced American History*, pp. 152–85.
Hacker, Woodley, and Rudolph, *The United States: A Graphic History*, pp. 30–32.
Harding, *Select Orations*, pp. 67–102.
Hart, *History Told by Contemporaries*, III, 241–43, 247–49.
Hicks, *The Federal Union*, pp. 185–212.
McMaster, *A History of the People of the United States*, I, 419–23, 434–504.
Muzzey, *A History of Our Country*, pp. 160–82.

It is extremely important that pupils be as keenly aware of the purpose or outcome of the unit as is the teacher, otherwise their study will have no direct association with their own development. Too often unit treatment fails to keep before pupils the outcome contemplated. A good unit assignment does keep pupils aware of the growth expected.

While significant understanding will be the aim of the preceding unit, it must be recognized that the aim is not reached immediately. Each idea must be linked with another and still other ideas until the intended concept is realized. Development of the unit is supported by the discovery of many direct relationships, and these relationships then merge to form the final under-

standing. However, no one relationship in itself is sufficient; a consummation of many interrelationships is necessary before final understanding emerges.

Surely, the starting-point is a keen realization of the conditions existing in the states when the thirteen were thrown upon their own resources. Necessity is the mother of invention. Satisfaction means inactivity. The well-fed man does not worry about hunger; the starving man might do anything to get food. Bad conditions and dissatisfaction affect the happiness and welfare of colonies or states. The economic, social, political, industrial, and moral conditions, and the foreign relations, must be keenly felt. It is in these impending and direful circumstances that pupils will live vicariously the actions and feelings and desires and worries of the inhabitants of the young nation. People always act in one way or another when conditions are trying. How will these states act? Will they find a solution for their difficulties, or will they disagree and separate?

In continuing the unit, the solution for these difficulties is the next phase of growth. What leadership have the states; who will influence; who will know enough to see the right course? What if there be too much disagreement? The convention is called, and representatives from the states, bringing different backgrounds, interests, and desires, meet. These men clash; it is interest against interest. Greed and selfishness and profit all are there, eager to obtain a hearing, never to be crushed. What do these men want for themselves and their fellows whom they represent? Out of this conflict comes a giving and taking, a compromise, a compact, an agreement; these men finally write down their agreement and call it the Constitution. The course is there specified, in black and white; there will be no quibbling later over what was decided. The money problem is settled, Congress will issue money; one state cannot make trade restrictions against another state, Congress shall regulate commerce and trade; no state can declare war, Congress alone can do that; the slaves shall not be considered as cattle, in determining population five of them shall count as three white men; Congress cannot do everything, its powers are specified. The Constitution is merely an agreement, a

course to pursue in meeting the perplexing problems so sorely trying the patience and threatening the existence of the states. What will the people do with the course of action outlined by their representatives, their leaders, their statesmen? Will the best thinking of Madison, Hamilton, Washington, and the others assembled at the meeting in Philadelphia be rejected as impossible, impractical, and selfish?

Concluding the unit, comes the rejection or acceptance of the plan of government. In each state the debate continues. Hamilton works overtime in New York trying to persuade his fellow-citizens that the course mapped out is the only desirable one Forces for and against the plan are surging in the other states. At last, the Constitution is accepted by the required number of states. The people have decided to try the new; they have decided to follow a representative form of government. What has history to say about the wisdom shown by the founders of our present pattern of national life?

5. *Development of the unit during the class period.*—As schools are now administered, pupils meet as groups in classrooms daily and are under the guidance of teachers during the class periods. What should go on during the class period in connection with the development of the unit, that is, after the view of the unit has been gained by pupils?

We shall assume that the teacher has worked on the unit assignment and has had it mimeographed so that a copy is in the possession of every pupil in the class. It would be quite natural to expect that a portion of it will be designated as a group assignment for the next period; this phase may be very much like a daily assignment except that it is part of a conscious development. Included in the portion assignment, of course, are those learning activities specifically designed to result in attainment of the objectives of that portion.

Following the assignment and such time for preparation as can be secured, the pupils and teacher, probably on the next day, would proceed along lines typical of any good classroom procedures. There could be questions and answers or any good form of discussion, reports, explanations, quizzes, demonstrations, audio-visual presentations, panel developments, dramatizations,

laboratory work, and directed study. Just what the work during the class period may be should be determined by the nature of the objectives, the learning most effective in attaining them, and the capabilities of the pupils. After this development, there should be summary unification so that pupils realize what has been achieved, how it fits into the unit purpose, and what the next part of the development will be. The last idea leads directly to the assignment for the next phase of the unit. These procedures would continue for several days or weeks or until such time as the unit purposes have been realized.

On the other hand, if the teacher desires to make the class period a work or laboratory procedure, she can introduce those activities that lean more toward individual effort instead of group exercises. In this case, there would be study during which each pupil would work along at his own rate, investigate problems or projects in which he was especially interested, have conferences with the teacher for special help or direction, and prepare whatever written materials were necessary to show his accomplishment and mastery. Even under a procedure leaning heavily toward individual instruction there could, at the discretion of the teacher, be times when group discussions and group activities are employed. These group activities would be related to those parts of development when collective action is more effective in learning than is individual study. At this time it must be pointed out again that the objectives, sound activities, and the capabilities of pupils should be the determining factors in helping to decide just what the procedures in guiding learning should be. It should be a rule-by-reason rather than a rule-of-thumb.

While the view does give the basic end toward which subsequent study will lead, it does not direct study to the supporting aims and specific learning exercises that make possible the unit purpose of accomplishment. Consequently, the course of learning needs to be planned so that a psychological sequence of activities finally results in attainment of the skill, concept, understanding, appreciation, attitude, or ideal set forth as the unit purpose.

In a daily assignment the aims and appropriate study exercises

can be given orally, as shown in the assignment on "The Declaration of Independence" (chap. ix). The assignment on "Air Pressure and Its Uses" was supplemented by objectives and learning activities in mimeographed form. A carefully planned set of exercises in mimeographed or printed form guides the learner and are known as guide sheets. Guide sheets are in reality the teacher's ideas in print; her ideas of aims, self-activity, types of learning, unity, and ways of stimulating effort all combined to secure most effectively the ability or abilities desired in pupils' growth. Directing learning by means of guide sheets is only a device, and the device alone does not guarantee effective direction of learning. Guide sheets are the blueprints in teacher planning; they contain the psychologically sound activities to be carried out in building a structure of learning. The guide sheet in "Air Pressure and Its Uses" directed activity into reading, experimentation, construction, explanation, comparison, observation, judgment, oral report, recall of previous knowledge and experience, and application. Other activities such as drawing, dramatization, listing, outlining, tracing, writing reports, solving problems, contrasting, and many other processes can be included in the printed directions. Guide sheets contain the steps by means of which pupils gain abilities, and the worth of the steps depends upon the instructor's aims and his understanding of the psychology of learning. Guide sheets are photographs of a teacher's ideas of what should be learned and how it should be learned. These photographs are never better than the originals.

Various procedures possible.—While the preceding unit deals with a development in the past and must necessarily depend upon reading and the examination of events already transpired, other units may relate to more immediate affairs in the lives of pupils. In such cases the teaching of these units, although holding to the ideas illustrated in connection with the Critical Period, can be varied so as to include different approaches, more pupil planning and participation, and different learning activities. To illustrate how the teaching of units may vary, a description of the procedures used in a ninth-grade course in "Community Life Problems" will be given.

Such a course in junior-high civics might well be set up on a laboratory basis, with maximum participation by pupils as the "learning by doing." Pupil participation need not be limited to class activity alone, but might include planning the course with the teacher. A discussion of experiences with a typical class during the past semester follows.

We agree that everyone should have a clear understanding, first of the term, community, and then, of problems associated with community life. After a thorough discussion of these terms the class suggested for study a list of communities with which they were familiar. It was necessary for the teacher to supplement this list with communities less familiar to the class. Our completed list, then, for the semester's course, consisted of the home, the school, the city, the county, the state, and the nation.

The class was then asked in what order it wished to study these units. The majority favored the city for the opening unit. I asked them what they wished to know about their city. I urged them to be very sincere in their questions and not ask merely for the sake of asking. They were to ask what they *really wanted to know*. The following are representative questions:

1. How is our city governed? 2. What keeps a person from voting at several places on election day? 3. Why and when was our city first established? 5. How do traffic accidents compare with those of other cities of about the same size? 6. Is delinquency a problem here? 7. Is our housing problem a serious one? 8. What industry employs the greatest number of people? 9. What are our health problems? 10. Is our city well zoned? 11. Does our city spend as much for recreation as do other cities of the same size? There were, of course, many more questions.

Our next step was to decide which of the foregoing questions should be studied by the entire class as a group and which should be considered by smaller groups, or committees, made up of people especially interested in some particular problem. It was decided that the class, as a group, should study all questions which pertained to the history, government, and delinquency of the city.

It seemed quite logical to the group that the history of our city should be the first subject for study. This question was put to the class, "What do you wish to know about the history of your city?" There were many interesting replies stated in the form of questions. . . . . Pupils turned to many sources for their information, varying from interviews with the city's oldest citizens to research activity in our public libraries.

In preparing for the next step, the study of city government, the class again submitted its questions, some of which follow: 1. How does one become a candidate for the city council? 2. What type of city government do we have? 3. How many are there on our council? 4. When and how is the election held? 5. How much does our city government cost and where does the money come from? 6. How does one take a complaint to the council? 7. How are ordinances passed?

It was suggested to the class that perhaps an interesting way to learn about city government and to find the answers to their questions

might be by setting up a so-called "city government" in our class. This suggestion met with much enthusiasm. It meant action, and that is always popular with young folks. Immediately they wanted to know, "How do we get started?"

I explained that perhaps the first essential step was that of permanent registration. And so everyone went to work on his registration card, one similar to that used in our city. The cards were filed with our temporary "clerk" for future reference. This presented an excellent opportunity to emphasize the necessity of proper registration in order to exercise the right of suffrage.

We were now ready to nominate candidates for the five departments of the council. Pupils were urged to consult their references for the proper procedure of announcing candidacy and of handling nomination papers. .... Candidates, with the help of their friends, prepared all sorts of posters advertising their candidacy. Campaign speeches were in order. (We insisted on the very best of oral expression!)

As the voters went to the polls they were not given a ballot unless their registration credentials were in order. This answered one of the questions raised, "What keeps one from voting in several places on election day?" .... After this election the new council was ready!

The first assignment for the new council was to hear complaints submitted by the other members of the class.

Complaints concerned bad street conditions, changes demanded in speed limits, neighborhood rowdyism, parking restrictions, garbage collection, etc. One boy stated that the street lights near his home had not been in working order for a week or so. This case finally resulted in notifying the city hall, and the lights were fixed at once! One boy insisted that there was need of a stop-and-go light at a certain downtown intersection. The council differed with this opinion. The ensuing discussion resulted in several council members joining this boy, and together they checked traffic at this intersection for a period of one hour. On the following day the council agreed that there was need of the demanded safety measure.

The third subject for consideration of the entire class was that of delinquency..... The study grew into an analysis of crime conditions in our city and what was being done about it. Pupils visited the city jail, court house, attended several court sessions, and interviewed several local judges.

Space does not permit a detailed account of the other units—the home, the school, the county, the state, and the nation.

As another instance of the program of "learning by doing," I might briefly mention our work on state legislation..... One of our classes represented the senate, the other the house of representatives. Bills followed in routine fashion and pupils learned how state laws were made by making a few themselves. It so happened that our state legislature was in session at the time, so this helped much in motivating the work. Pupils would anxiously read the papers about the state legislative program, for they felt they had something "in common" with the legislators! To climax this unit

the class journeyed to the state house and observed the legislature in regular session.[3]

Development of this unit is characterized by a steady and cumulative attack from day to day. Each meeting of the teacher and pupils is devoted to taking of stock, deciding on the next phase of study, planning ways to proceed, giving of reports by individuals and committees, and holding of group discussions. Pupils are given a large share in the planning. The learning activities often take the form of observations, firsthand investigations, interviews, and readings of current materials. As contrasted with the unit on the Critical Period, the assignment evolves as study continues and is not given out for the whole unit in mimeographed or printed sheets.

THE TEACHER'S PART IN UNIT PLANNING

No magic is needed to plan a unit of instruction. Only clear and sound ideas pertaining to a basic development and the kind of learning effective in producing that development are required. Take the planning and thinking and discovering out of teaching, and you take the essence of growth from teachers and substitute those routine and commercialized practices so agreeable to passive and easily satisfied souls. The market is being stocked with prepared units, so that all instructors will soon be able to reach into a file and pull out a unit in any area of learning. One might recall the workbook deluge and then surmise that the murmuring stream of unit materials will soon be swelling into flood proportions. Teachers may read for ideas, but even more should they think out and teach out wholeheartedly and understandingly the units they themselves develop intelligently and sincerely. Effective units are the products of teacher endeavor and not the impersonal products of printing presses. Pupils deserve a more personal, intellectual, and emotional relationship with teachers than is afforded by the routine handling of the implements of mass production.

[3] J. A. Sheldon, "Community Life Problems: Pupils Study Conditions in Des Moines," *Clearing House,* September, 1941, pp. 8–11.

APPLICATION EXERCISES

1. Point out just where the view ends and the unit assignment begins in the unit on taxation. Bear in mind that this sketch of taxation was meant to give the feel of learning rather than to show a carefully prepared unit on taxation.
2. Plan a view that you consider good for some unit of your own choosing. Give the view before the class and have them evaluate it.
3. Is a view necessary? Would the learning be as good without a view? Explain.
4. Work out a unit in your major subject or field. Keep the assignment and use it, if possible, when you get a position as a regular teacher. You will probably make a few changes, but the general framework might be substantially the same.
5. Do you think that it would be more difficult and trying to teach out a unit such as "The Critical Period" or a unit such as "Community Life Problems" as given by Sheldon? Justify your answer.
6. Do you think it is possible to make oral daily assignments take the place of mimeographed guide sheets in unit teaching and still get comparable results?
7. Are there some subjects or fields of learning not well adapted to unit teaching? Why?
8. In giving a view, various approaches are possible. What, in your opinion, constitutes a good approach?
9. Which principles of teaching are probably taught out better if the teacher uses the unit concept of teaching effectively?
10. Is the unit a larger concept than unity, or is a unit only a device to secure more unity?
11. What should determine the amount of time devoted to the study of a unit?
12. Fontaine states that the pupils' lack of real understanding is due to the fact that the teacher himself did not have the understanding in his own mind. Do you agree with Fontaine. Justify your position.
13. Should a teacher follow the units worked out by some expert in her field or should she devise units for herself? Several very important factors are involved in this question.

RELATED READINGS

BILLETT, R. O. *Fundamentals of Secondary School Teaching*, chaps. vii–xviii. Boston: Houghton Mifflin Co., 1940.

BOSSING, N. L. *Teaching in Secondary Schools*, chap. iii. 3d ed. Boston: Houghton Mifflin Co., 1952.

BURTON, W. H. *The Guidance of Learning Activities*, chaps. xii–xiv. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

DOUGLASS, H. R., and MILLS, H. H. *Teaching in High School*, chap. xi. New York: Ronald Press Co., 1948.

EASTERN COMMERCIAL TEACHERS ASSOCIATION. *Unit Planning in Business*

Education: Fifteenth Yearbook, chaps. iv–xi. Somerville, N.J.: Somerset Press, Inc., 1942.

GOETTING, M. L. *Teaching in the Secondary School*, chaps. xv–xx. New York: Prentice-Hall, Inc., 1942.

LEE, J. M., and LEE, D. M. *The Child and His Curriculum*, chap. vii. 2d ed. New York: Appleton-Century-Crofts, Inc., 1950.

MACOMBER, F. G. *Teaching in the Modern Secondary School*, chaps. iv–vi. New York: McGraw-Hill Book Co., Inc., 1952.

MORRISON, H. C. *The Practice of Teaching in the Secondary School*, chaps. x–xiv. Rev. ed. Chicago: University of Chicago Press, 1931.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools*, chaps. xiv–xv. 2d ed. New York: American Book Co., 1947.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools*, chap. v. New York: Appleton-Century-Crofts, Inc., 1948.

THUT, I. N., and GERBERICH, J. R. *Foundations of Method for Secondary Schools*, chaps. ix–xiv. New York: McGraw-Hill Book Co., 1949.

UMSTATTD, J. G. *Secondary School Teaching*, chaps. vi–ix. 2d ed. Boston: Ginn & Co., 1944.

CHAPTER XI

IMPROVING QUESTIONS AND QUESTIONING

AFTER the assignment has been carefully and adequately made, the time comes to choose effective procedures in directing the work of pupils when they begin their study of the assignment or have completed it. To state the same idea in another way, one can say that not all the teaching time will be devoted to the making of assignments; hence, the remainder of the time will necessarily be given to other teaching activities which should be most influential in fostering progress. Several principles of teaching are brought forcibly to the front in guiding learning after assignments are made. Practically all the criticisms of instruction are focused upon the inefficient procedures employed in using the remaining class time. If teaching is weak during this time, then no efforts should be spared to build up the backgrounds of beginning or experienced teachers so that they utilize the remaining portion of class periods profitably.

The criticisms.—Probably the most caustic criticisms are those centering upon lesson-hearing, question-and-answer, and recitation-testing procedures. Stormzand says:

> The most serious disadvantage of all in the use of textbooks, amounting to a real danger, a shameful waste, an almost criminal inefficiency, lies in the formal, mechanical use of a textbook as furnishing material for a daily grind of recitation-testing.[1]

In a similar strain Fontaine writes:

> Is testing the same as teaching, or is it only incidental to teaching? How many teachers think they are teaching when they are merely hearing lessons? Is it any part of a teacher's job to train children in the *how* and *why* of doing things, to develop powers of classifying and organizing, or perceiving relationships of cause and effect; or is this the parent's job or the pupil's, the teacher's function being merely to test for the purpose of finding out whether the job has been well done? How many teachers teach as though they regard the development of the faculty of memory and the

[1] M. J. Stormzand, *Progressive Methods of Teaching* (Boston: Houghton Mifflin Co., 1927), p. 10.

ability to assimilate a store of mere information as the chief goals of the school?[2]

Imagine a page-to-page assignment given hurriedly during the closing seconds of a class period; imagine the lesson next day with the teacher testing, pumping, tediously extracting what pupils have memorized during their time outside the class, at home, anywhere; pupils were assigned so many pages, and they should be able to repeat the facts contained therein; the teacher's time is spent in detecting and ascertaining whether the pupils know; her job is to find out and grade accordingly; if she grows impatient with poor recitation of facts and details, she scolds, warns, and threatens with impending examinations and sure-to-be flunks; if the reiteration of textbook gleanings is too feeble, she keeps the class after school or assigns the same pages again. No wonder criticisms have been directed against such teaching! There have unquestionably been the weakest kinds of influences brought to bear upon the promotion of learning, both during the assignment and during the remainder of the time in class periods.

A word of caution should be inserted at this point. Care should be exercised in condemning a procedure as outright inefficient, for it may not be the procedure which is itself at fault but rather the ineffective manner in which it is used or the wrong purpose to which it is put. The common practice of eating is a very wholesome and indispensable one, yet it has been improperly used in overeating, chewing insufficiently, or eating the wrong food. So, in teaching, one cannot justly label a procedure as pernicious and criminally wasteful in itself; it may be that the procedure has meritorious possibilities but that the neglect or abuse of these possibilities produces results far below rightful expectations. Instruction of the very highest kind is often of the question-and-answer variety. Regardless of the criticisms of the lecture method, this method sometimes is above any other in valuable accomplishments. The fundamental criterion, then, is not the name of the procedure but the potentialities in it. The maximum realization of the potentialities in any method depends upon the teacher. Greatest hope for better teaching will, no doubt, come

[2] E. C. Fontaine, *Ways to Better Teaching in the Secondary School* (Boston: Ginn & Co., 1928), p. 4.

from the intelligent use of the common procedures first. Further utilization of the possibilities in the common practices or the gradual adoption of more technical deviations can be effected as the understanding of the teacher becomes more profound.

IMPROVING QUESTIONS

The great bulk of instruction in secondary schools is carried on by the question-and-answer method. While frequency of occurrence cannot be taken as an indication of merit in itself, it does show how activities are directed during class periods. Beginning teachers will employ the method quite generally, as will experienced teachers, and if faith is placed in the saying that we should learn to do better the things we will do anyway, then some determined effort should be made to bring about improvement in the method so widely employed.

Poor questions.—An introduction can best be made by furnishing an illustration of teaching by the question-and-answer method. The lesson chosen pertains to fur trade, fishing, and forest products in Wisconsin. Only a part of the complete lesson is given here:

TEACHER: Which of these animals are still being trapped, Roy?
ROY: Minks and weasels.
T.: Now, then, Charles? (Charles missed before.)
C.: Minks and weasels.
T.: Oh, that isn't helping any by reading off a paper. June, will you tell us?
J.: Minks, weasels, foxes, beavers.
T.: One animal hasn't been mentioned yet. A fur-bearing animal, Walter?
W.: They shoot wolves.
T.: Don't they trap wolves? Yes, they shoot and trap them both. The third question on the board, Sarah. (The question: How do we keep the supply of fish from being exhausted?)
S.: (Cannot answer.)
T.: Peter?
P.: Little ones are thrown back into the water.
T.: How does that help any?
P.: They grow big then.
T.: When does trout season open?
P.: You can catch them any time.
T.: Open all the time?
P.: No! No! No!

T.: When does it close?

P.: August 31.

T.: August 31. When does bass season open? Some of you were down at the creek one night and some bass were caught there. There is a law in Wisconsin keeping the supply of fish from being run out. What is the main reason though for keeping the supply of fish from being run out, Gordon?

G.: (Cannot answer.)

T.: What is a fish hatchery?

G.: (Again, no answer.)

T.: Walter, what is a fish hatchery?

W.: A place for raising little fish.

T.: What is an incubator?

P.: The eggs hatch in them.

T.: What kind of eggs?

P.: Fish eggs.

T.: All right, they do what then? Hatch fish. Get a certain kind of egg and have a certain kind of fish. Tomorrow I want you to look up and see where the different fish hatcheries are in the state. The fish hatcheries in Wisconsin. The fourth question, Edmund. (The question: What are the most numerous kinds of fish?)

E.: Trout and bass.

T.: What kind of fish do you catch around here, Roy?

R.: (No answer.)

T.: Walter?

W.: Trout.

T.: And what other kind?

W.: (No answer.)

T.: James, will you name the different types of fish?

J.: Lake fish and river fish.

T.: That is most general. Some other kinds. One other fish you get in the wintertime is sent down from Green Bay. What is that?

P.: Herring.

T.: Yes. Open your books to page fourteen, fourteen in the back of the book. What kinds of forests do we have in the northern part of the state, Kathryn?

K.: Pine.

P.: Beech.

P.: Maple.

P.: Oak.

T.: And where is the most hardwood in the state?

P.: Center.

T.: Take the first question given there, Sarah. (Question in textbook.)

Stevens made a study of the efficiency of instruction as measured by the number of questions asked during class periods, and her conclusions, although drawn in 1912, hold almost as tena-

ciously today as they did then. Her method of investigation and her conclusions appear next:

The first impression borne in upon me while making the series of one hundred observations was that of the large number of questions. It was almost overwhelmingly, as I proceeded from class to class, to find two, three, and four questions per minute the speed of one teacher after another, in one subject after another. It seemed so preposterous that I was not satisfied until I had the stop watch upon my own accomplishment in that direction and found that I could match the speed with ease.

If these studies in observation and the material of the stenographic reports are to be of service to the professional work of supervisor and teacher, they must be interpreted in terms of their significance in the process of instruction.

First: The large number of questions suggests the maintenance in the class room, for considerable portions of time, of a highly strung nervous tension where there should be natural and normal conditions.

The teacher who has acquired the habit of conducting recitations at the rate of from one hundred to two hundred questions and answers per classroom period of forty-five minutes, has truly assumed the pace that kills. It is deadly to the nervous organism that maintains it, and by reflection, injurious to the children who live in that atmosphere.

Second: The large number of questions suggests that the teacher is doing most of the work of the class hour instead of directing the pupils in the doing.

Third: The large number of questions suggests that whenever teachers, either individually or collectively, preserve such a pace for any length of time, the largest educational assets that can be reckoned are verbal memory and superficial judgment. It is quite obvious that with the rapid fire method of questioning there is no time allowed a pupil to go very far afield in his experience in order to recall or to associate ideas in fruitful ways.

Fourth: The large number of questions suggests that there is no time in the mechanics of the school room to cultivate the gentle art of expression.

Fifth: The large number of questions suggests that there is little thought given to the needs of individuals. The teacher sets the pace in his questioning: the pupils follow as a body, or drop by the wayside. . . . . The moment we admit that we ask from 75 to 175 questions in a class period, we commit ourselves as "drivers" of youth instead of "leaders"; drill masters instead of educators.

Sixth: The large number of questions suggests that we are coming, more and more, to make the class room the place for displaying knowledge instead of a laboratory for getting and using it. At the close of a class hour, the teacher assigns a lesson for the next day; the pupils take the books home for the purpose of learning the lesson; the following day the teacher gives the pupils the opportunity to display how much or how little they learned. In some cases this represents the process of class activity from the beginning of the year to the end.

Seventh: The large number of questions suggests that in actual practice

there is very little effort put forth to teach our boys and girls to be self-reliant, independent mental workers. The discrepancy between our theory and practice is nowhere more patent. With the tremendous pressure incident to the rehearsal of questions numbering from seventy to one hundred and seventy, for the purpose of covering every conceivable issue expressed in the pages of a text assignment, the teacher loses sight of the fact that he has a *youth* to teach through the medium of his subject. There is no time to teach him how to study: how to organize subject matter, how to judge relative worths of facts studied, what to memorize. Even if the teacher himself possesses a plan of work that is in itself a model of organization, its value is likely to be lost sight of in the rapidity and intensity of questioning activity. If there is no time for the teacher's own fine intellectual work to be made apparent it is not to be expected that time will be found for the slower process of forming and fixing habits of study with boys and girls.

There is no use in claiming to teach boys and girls how to study, and how to command their own intellectual forces by the current practice of keeping them at the point of the bayonet in rehearsal of text-book facts at the rate of two or four per minute.[3]

These conclusions depict strikingly the aims toward which questioning has been overwhelmingly directed—namely, the fast reiteration of materials previously assigned and reduced to quick mental responses. Class time has been used primarily to check the degree of conscientiousness to which pupils reduced materials to trigger-like responses, and if, with the slightest pull of questions upon the triggers, responses popped out immediately and regularly, the duty of teaching was considered and believed to be admirably fulfilled.

Causes of poor questions.—Every criticism launched against the question-and-answer method is surely justified when directed at instruction as previously portrayed in the geography lesson on fur-bearing animals, fish, and forests in Wisconsin. A picture of more wasteful and profitless teaching would be difficult to paint. A perusal of the questions gives an exact photograph of the mind from which the questions emerged. There is an everlasting emphasis upon bits of information, upon facts about kinds, numbers, and locations, and upon the specific items mentioned in the textbook. A mind that has nothing higher than bits and items as aims cannot be improved appreciably by a few

[3] Romiett Stevens, *The Question as a Measure of Efficiency in Instruction* ("Teachers College Contributions to Education," No. 48 [New York: Columbia University Press, 1912]), pp. 16–26.

lessons on how to question, different kinds of questions, or techniques in questioning.

The remedy.—When we say that a teacher's questions are poor, we actually mean that her knowledge and thinking are weak. Why not be honest and call a spade a spade? We endeavor to improve everything by techniques; on the contrary, the source responsible for the weakness should be strengthened and invigorated. It would be out of order to condemn any method if bits of information are the highest aims in the teacher's mind. To ask thought questions without first having thoughts is as inconceivable as having objects fall upward. If the fundamental weakness is poor aims, then fault should be found with the aims and not with the procedure, for a procedure is a means which can be used for various purposes. The same pen that was used to write the Declaration of Independence could be manipulated to write a scandalous story, and, likewise, the questioning procedure can produce meritorious or ineffective results. The possibilities in a procedure, as in a pen, depend upon the purposes within the mind of the user. To expect the blind use of any method to produce good teaching and profitable learning is expecting too much. Absence of worthwhile aims can tone down the effectiveness of instruction and learning to the vanishing-point.

The thesis that the teacher should use her time most profitably in influencing and promoting learning holds firmly with reference to questions in class work. A procedure can be improved by bending or shaping it so as to accomplish what is most worth while; but worth-whileness must be secured, for otherwise the procedure is ineffective. For example, the problem of furs and fur-trading in the geography lesson has many valuable aims left untouched. To blame the method for the omission is unwarranted. Not many miles from this teaching was a large fox farm, a few miles north was a mink and muskrat farm, and many of the pupils' fathers were engaged in fox-farming on a smaller scale. What motives on the part of these farmers are at work? Why these new enterprises? What an opportune situation to bring out some striking economic principles of profit, new occupations, dying occupations, supply and demand, cause-and-effect relation-

ships! Do the social ambitions of women in New York or Philadelphia or London help to provide bread and butter for Wisconsin fox-farmers? What if style should change? What if a substitute for furs be found? Is it possible that a fur from Europe or Asia might become fashionable? What gripping opportunities to generate new ideas, viewpoints, economic principles, competition, conservation, ruin, profit, greed, psychology of human cravings and wants, changing occupations, and future implications! But, no, these concepts were not in teacher's mind, and so the only possibilities utilized in treatment were the simple and quite profitless test questions whose highest purpose was the search for a few fragmentary morsels of dry information supposedly already memorized.

The question-and-answer method can make important contributions, but discrimination must be exercised to determine the proper time in the learning when the method effects growth most advantageously. If the ends are promotion of new viewpoints, deeper insights, the understanding of causes and effects, the arousal of interests, the development of appreciations, or the settling of issues and problems, then the procedure may be very effective, probably the most influential in directing learning during a given period of time.

In any fundamental consideration of the questioning procedure, one can state without hesitation that there must first be sound purposes in mind, and then the next step is to achieve the purposes by the discriminatory use of questions. In all instances, however, the purposes will determine the quality of questions. In the geography lesson, the ends themselves were utterly contrary to a good conception of worth-while instruction. Under another instructor whose purposes were sound and substantial, the questioning procedure would have served effectively in promoting genuine achievement, and the words describing the teaching and learning of the same topic of fur-trading might honestly be: What wonderful teaching!

Sound ideas and purposes shape questions so that questions become effective means of stimulating growth. To reverse the process and center upon the form of the question is not the solu-

tion, yet a number of investigators try to make the vocabulary revive the procedure. There are when, where, what, why, how, compare, contrast, classify, and many other descriptive terms. These are attempts to improve questions by drawing attention to the forms. Such attempts act as ointment upon external parts, and the ointment never penetrates to the internal source of the trouble. Only by strengthening the source from which the questions come will there be any fundamental improvement, and that source is the mind. Suppose there are too many *when* questions, what will a mind bent upon memorization of dates do? It will naturally eliminate the *when* and substitute *at what time* or *during what year*. The form has been changed, but the import or purpose in asking the question is the same, the teaching is the same, and the learning has not changed.

It is essential that beginning teachers and experienced teachers realize the importance of developing their own minds before their teaching can be improved. The person who has ideas, thoughts, different viewpoints, notions of genuine values, and real purposes and aims in mind will ask questions in keeping with profitable achievement without seeking a mechanical clue in the specific words or forms in framing questions. The purpose of the question, rather than its form or wording, is the all-important factor. A thought question is a thought question regardless of the vocabulary used. Purposes pull in the words needed to give the purposes proper expression.

Purposes of questions contrasted.—Lincoln's Gettysburg Address is so familiar to everybody that it is chosen to illustrate how aims may vary and how the aims determine the quality of the questions. In one classroom the questions are:

1. Where did he give it?
2. When did he give it?
3. What was the occasion?
4. How many years are there in a score?
5. How many years are there in four score and seven?
6. Who is ready to recite the Address?

Questions asked in the second classroom are these:

1. What was the basic principle upon which Lincoln developed the Address? Did Lincoln think of the principle first or did others before Lincoln believe in it?

2. Did you notice any time sequence?
3. What message did Lincoln leave with his fellow-citizens?
4. What feelings would you have had if you had been at the dedication and heard Lincoln?
5. Suppose you had never heard of Lincoln; do you think you could tell something about his character from just reading the Address?

So obvious is the difference in quality between the two sets of questions that only a few brief comments are added. The difference is assuredly not one of words, because in both sets the vocabulary is simple. Aims in the second group of questions are highly significant; there are relationships, understandings, appreciations, and ideals stimulated and promoted. The first set again portrays a mind desirous of memorized facts as the aims of education.

Purposes of questions.—Although questions serve many purposes, emphasis will be given to what seem to be the most important purposes. Among these purposes are:

1. To change viewpoints
2. To bring out cause-and-effect relationships
3. To develop new ideas
4. To promote understanding
5. To apply information
6. To stimulate thinking as a logical process
7. To develop appreciations, ideals, and attitudes
8. To discover the status of group or individual learning
9. To create mind-set.
10. To test for objectives taught

Several of the purposes have been illustrated in previous chapters; consequently, only a few of the purposes need further clarification. Questions used in the illustrations to follow should be examined for their direction-of-learning value rather than for their intrinsic worth.

To change viewpoints:

PUPIL: I don't believe in compulsory attendance laws for pupils over twelve years.

TEACHER: Did you ever regret something you did?

P.: Yes, I have never been to a dentist, and several of my best teeth are badly decayed.

T.: Is it your fault?

P.: I think my parents should have looked after me. I didn't know what harm was happening to me.

T.: Do you think that harm might come to a young person educationally if he neglected his education and his parents didn't care?

P.: Yes, I think so. Sometimes a young person doesn't know what is good for him, and sometimes his parents don't know either.

To bring out cause-and-effect relationships:

P.: Why should farmers start fox farms?

T.: Do you think they start farms just for recreation?

P.: No, some farmers work mighty hard.

T.: Why does the bricklayer work all day?

P.: He works to make money. Some of them work eight hours a day and make a dollar an hour.

T.: Is a fox fur very expensive?

P.: Yes, mother has one that cost nearly a hundred dollars.

T.: Do you see why farmers might raise foxes rather than potatoes?

P.: Yes, I see now.

To develop new ideas:

P.: What is a protective tariff?

T.: You have heard of fire protection, haven't you?

P.: Fire protection means that a man will get so much money if his house burns.

T.: How does a merchant protect his business?

P.: He must keep his customers and give them a square deal.

T.: What may happen if a chain store opens across the street from the merchant?

P.: There would be competition. The chain store would probably undersell the merchant.

T.: Do you suppose a manufacturer in Boston might want protection of some kind?

P.: Some foreign manufacturers might undersell him.

To stimulate thinking as a logical process:

T.: Would the average I.Q. of college Seniors be higher than the average I.Q. of seventh-graders?

P.: The college Seniors have grown more and know more, so their average would be higher.

T.: Yes, but the I.Q. doesn't change very much one way or the other; it's quite constant.

P.: Probably the tests are not valid. It is more difficult to measure the intelligence of college Seniors.

T.: Suppose we take the I.Q.'s of the college Seniors when they were seventh-graders, the factor of test variation will then be eliminated.

P.: I still think the added training makes the difference in favor of the college Seniors.

T.: But the I.Q. doesn't change; and it might vary as much down as it does up.

P.: I can't see any other explanation.

T.: Aren't there some real factors that you haven't considered? If the numbers 3, 5, 7, 6, and 9 are added, what is the average size of the five numbers?

P.: It's 6.

T.: What would the average be if the 3 weren't considered?

P.: It's 6½; that's larger than 6.

T.: Now, think of the seventh-graders as they journey through high school and college.

P.: Many of them drop out.

T.: Which ones?

P.: The poorest ones. Oh, I'm beginning to see the reason.

To develop appreciations, ideals, and attitudes:

> Perhaps in this neglected spot is laid
> Some heart once pregnant with celestial fire;
> Hands that the rod of empire might have swayed,
> Or wak'd to ecstasy the living lyre.

T.: What does a mother think about as she watches her little son toddle around on the floor?

T.: Why are our feelings touched more when a child dies than when an old man passes to the beyond?

T.: What would the world have lost if Pasteur had died when he was a young lad?

Which aims are pupils likely to neglect or overlook in their preparation? What part can the question-and-answer method play in assisting pupils to see these aims? The two questions serve as guides, and, if they are not kept uppermost in mind, the questioning procedure rambles on as the orthodox way of using class time, and it often rambles into inefficiency. In the great majority of cases, aims demanding the operation of higher mental processes before real attainment is possible, are the aims neglected or overlooked because they may be extremely difficult, sometimes impossible, for pupils to discover and master without the proper stimulation and direction from another person. Questions serve their highest teaching purpose when they arouse and guide learners to exercise the sound mental processes culminating in full achievement. But questions, like every other means, have their limitations; they can stimulate thinking, but they cannot give information with which to think—study does that; they can facilitate the recall of past experiences, but the experiences must be gained first—actual participation does that; they can direct attention to what must be learned, but they cannot produce the knowing—reading, experimentation, reasoning, and remembering do that. In short, questions are the means to stimu-

late and direct learning, but the learning itself is individual effort.

Testing to find out what is already known is neither stimulation nor direction; it is marking time; it is classroom inefficiency. It is hoped that the reader has passed far beyond the place in his thinking where the questioning procedure as a way of spending class time is considered merely a textbook-recitation, fact-reiteration, or lesson-hearing checking-up device.

Socialization.—Among procedures recommended by authors of books on principles of teaching is the socialized recitation. This way of conducting classroom activities is a break with the formal type of recitation dominated by the teacher as inquisitor and the pupils as the quizzed. In the socialized recitation the co-operative spirit prevails, volunteering is in order, every member assumes responsibility to the group, a free and loyal relationship prevails, and learning becomes a group undertaking approximating a real social situation. From this co-operative enterprise there emerge a stronger motivation, a different attitude toward learning, practice in working with and for others, and civic and social development. The philosophy of learning by doing permeates the classroom in the method, whereas the old recitation, characterized by the teacher versus pupils, produced passivity and rigid conformity.

There is no inherent limitation in the question-and-answer procedure which hinders in any way the derivation of the values claimed for the socialized recitation, and, moreover, the questioning method, if used in accordance with its possibilites, becomes one of the most effectve ways to secure socialization. It is not the procedure which insures social and co-operative effort, but it is the spirit and attitude of the director which generate real, socialized, and co-operative participation.

Socialization, in its highest form, results from teaching which stimulates and fosters the rise of problems, growth of ideas and concepts, change of viewpoints, promotion of reasoning, and inculcation of attitudes and ideals. Both teacher and pupils give and gain. By initiating and promoting this kind of learning, the questioning method can fulfil one of its most signal possibilities.

In chapter v, section 4, is an illustration of the use of questions in deriving the answer to a problem in science, and surely the socialization there is genuine and profitable. There is active socialization in the assignment of the Declaration of Independence. When genuinely carried on, the questioning procedure is a socializing means of the highest form, because pupil energy is directed into activities that lead to acquisition of true personal and educational values. So often the socialized lesson becomes a pointless display of unregulated freedom, devoid of any personal or academic worth; but in the care of a capable instructor the questioning method can be pointed and profitable as well as highly socialized. It would not be difficult to visualize a developmental lesson on fur-trading in Wisconsin taught by means of questions, and still have the classroom activities realize the best aims and fulfil the best practices claimed for the socialized recitation.

Wording of questions.—Since questions are requests to act, the reaction demanded in answering should be thought through carefully before the question is formulated.

1. The question should be clear and definite. "Discuss," "tell about," and "what about" formulations are too general; meanings should be restricted to certain areas. For example, "Contrast the views of Hamilton and Jefferson with respect to division of powers between the federal and state governments," restricts the area for discussion; but, "Contrast the political philosophies of Hamilton and Jefferson," is too indefinite and sweeping.
2. Questions should not be too wordy. For example, "You are, no doubt, familiar with Archimedes' principle by this time, so you should be able to make applications of the principle to some present-day problems in science without much difficulty, and, now, I will call upon Harry to show what uses are made of the principle in modern civilization," is a question unnecessarily wordy.
3. A question should call for a single and unified reaction. For example, "Why was the Monroe Doctrine formulated at this particular time, what were its provisions, and what attitude did the European countries have toward it?" is a triple reaction question. Each one of the parts is broad enough to serve as one distinct question.
4. The vocabulary should be suited to the subject field and to the ability of the group. Every subject has its particular vocabulary, but after the technical terms have been developed they should form part of the questions. Words in the general vocabulary should be selected judiciously. A

textbook for junior high school history classes included *embryonic, vicissitude,* and *economic stability* on one page in the first chapter. Although such words are freely used by adults, these words are beyond the ability range of young persons. In response to this conclusion made by a teacher: "In a nutshell, the voters decide in a democracy," one boy exclaimed, "Do you really mean in a nutshell?"

5. As a rule, it is better to frame the question in a definite way and then ask it as framed than to ask for the same reaction in several different wordings. "What is iambic pentameter verse, or can you give a definition of this kind of verse?" Either of the questions is sufficient in itself. Of course, the aim determines how refined the question will be.

IMPROVING QUESTIONING

Good procedures in questioning.—While directing learning by means of questions, the teacher needs to fulfil a number of desirable practices which make the questioning process more effective.

1. The sequence of questions should lead to the development of a particular understanding, idea, appreciation, or ideal. Rambling questions keep learners in a confused state of mind. Questions are teaching and learning devices, and the developmental purpose during questioning should always receive first consideration.
2. Train pupils to give well-rounded answers to questions, that is, to develop the full import of the questions. Short and choppy answers are caused by questions demanding only short and choppy answers or by the teacher's being satisfied with partial development of answers. Complete development of answers requires effort, and the effort put forth will depend upon the standards upheld by the teacher. Pupils do just about what is expected of them.
3. Ask questions within the range of pupils' experience and knowledge. As a rule, adults forget that young persons are learners and not learned.
4. Give time for reasoning and other higher mental processes to operate. Refrain from making the classroom "a place for displaying knowledge"; instead, make the classroom "a laboratory for getting and using it."
5. Be conversational and natural during questioning. Be a helper, not an inquisitor. Pupils will soon learn whether the class period is for checking results or whether it is for learning. The attitude of the director becomes the attitude of the ones directed.
6. Be jovial and cheerful. Learning can be delightful and pleasant, cooperative and profitable, only if the personal relationships between pupils and teacher are conducive to mutual helpfulness and understanding.
7. Encouragement motivates, discouragement represses. There will be ups and downs in the learning, to be sure, but keeping the successes in mind inspires more than utilizing failures as warning signals.
8. Encourage pupils to ask questions. Their questions, if sincere, show

exactly what the difficulty or interference is in the path of progress.

9. If there is anything in the answer which can possibly be salvaged, use it. "You're dead wrong" as a teacher retort deadens present and future ambitions. "I think we can use that idea in connection with another topic in a few minutes," "That may be partly the cause, but probably there is a better reason," and "I think you have an idea in the budding stage; can't you make it full grown?" are examples of comments inviting more effort.
10. Have pupils feel responsible for the answers to questions asked by their own classmates. The teacher should not feel that she must be the quick and final authority. Shift responsibility to pupils in so far as possible.
11. Do not feel it necessary to answer every question asked by pupils. Never resort to "bluffing." Be a learner along with the class. "We will find out and let you know or probably you will discover the right answer before we do" is a good way to denote that learning is continuous, even for the instructor.

Basically, there is nothing wrong or inefficient in the questioning procedure as a way of teaching, but there is often something fundamentally wrong and inefficient in the purpose for which it is used. It has been whipped and warped and abused until its real possibilities have been lost, leaving only the skeleton of testing for dry and memorized facts as its heritage. When used for real purposes—for promoting thinking, for searching out new ideas and viewpoints, for developing appreciations and ideals, and for directing learning to deeper and broader understandings—this same method takes a new lease on life. It breathes and vibrates, it grows strong and useful, and it lives out its valuable possibilities.

SUMMARY

Regardless of the criticisms brought forth against the question-and-answer method, this general and universal procedure has genuine possibilities provided it is used purposefully and intelligently. We must be careful not to condemn a practice as such because it may be not the name but the way that it is handled that should be singled out for criticism. In attaining many aims, socialization is very effective. Our educational psychologists consider socialization as a basic activity in learning. If properly guided, the class discussion brings out the best thinking of each pupil; it gives everyone an opportunity to co-operate in developing some problem or understanding or appreciation

according to his feelings and ideas; it promotes training in citizenship; and it contributes to growth that depends upon social stimulation. A large part of one's education comes from the ideas and contributions and interreactions brought out in sincere group participation. The printed words do not have a monopoly in the initiation and advancement of learning; listening and expressing as potent factors in learning are beginning to receive the attention that they deserve.

APPLICATION EXERCISES

1. This technique will influence the learning of pupils somewhat: "Mary, enumerate the chief provisions of the treaty." Can you discover the technique involved? By mentioning the pupil's name first, the other members of the class are relieved of all responsibility; they have a little mental vacation because the job is given to Mary from the very beginning. In the following examples, discover what the particular technique is and how it influences learning:
   a) Give us one way of preparing oxygen in the laboratory, Dorothy Acker. (Pupils are called upon in alphabetical order, Acker being first.)
   b) What is oxidation? We will begin with the first row and take the other rows in order.
   c) Do we need to prove what is given in the hypothesis?
   Do we need to prove what is given in the hypothesis?
   d) T.: What does the Constitution say about coining money, Fred?
   F.: What was the question?
   T.: What does the Constitution say about coining money?
   e) DOROTHY: The Constitution gives Congress the power to coin money.
   ROBERT: I didn't hear what she said.
   TEACHER: Dorothy, will you repeat your answer, please?
   DOROTHY: The Constitution gives Congress the power to coin money.
   f) T.: Who wrote "Evangeline"?
   P.: Longfellow.
   T.: Yes, Longfellow.
2. If pupils are not called upon according to rows or alphabtical order, how will a teacher be sure that during several days each pupil has had about the same number of questions to answer? What will assist a teacher so that she might have good distribution of questions?
3. Show the relationship between aims and questions. Give several illustrations.
4. Why do you suppose the question-and-answer method has been connected with textbook recitation so strongly? If teachers were forbidden to use textbooks, would the questioning method be improved? Why?

5. Although well-rounded answers are desirable, there are times when long and complete answers cannot be expected. Under what conditions should well-rounded answers be expected? When would you say a short contribution is about all that can be given?
6. The answers given in this chapter to illustrate how to change viewpoints, to bring out cause-and-effect relationships, and to develop new ideas are short answers. Are the short answers justifiable under the circumstances? How quickly are cause-and-effect relationships thought out? Would you expect longer answers to questions in review or in developmental work? Why?
7. Do you think pupils are always inattentive if they ask the teacher to repeat her questions?
8. Should a question be re-worded? Under what circumstances?
9. Stevens states that the gentle art of expression does not have an opportunity to grow in the ordinary classroom. What does she mean? Is it true that there is "no impression without expression"?

RELATED READINGS

Bossing, N. L. *Teaching in Secondary Schools,* chap. xii. 3d ed. Boston: Houghton Mifflin Co., 1952.

Burton, W. H. *The Guidance of Learning Activities,* chap. xvii. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

Lancelot, W. H. *Permanent Learning,* chap. xvii. New York: John Wiley & Sons, Inc., 1944.

Muse, M. B. *Guiding Learning,* pp. 322–33. New York: Macmillan Co., 1950.

Risk, T. M. *Principles and Practices of Teaching in Secondary Schools,* chap. xxiii. Rev. ed. New York: American Book Co., 1947.

Rivlin, H. N. *Teaching Adolescents in Secondary Schools,* chap. vii. New York: Appleton-Century-Crofts, Inc., 1948.

Ruediger, W. C. *Teaching Procedures,* chap. xxi. Boston: Houghton Mifflin Co., 1932.

CHAPTER XII

ASSISTING PUPILS TO GROW THROUGH INDEPENDENT STUDY

THE title of this chapter centers attention upon the words "independent study." To instil in the reader a keen appreciation of the importance of independent study and to give a basic treatment of the steps to follow while assisting pupils to develop their ability to study are the purposes of this chapter.

A letter written by a mother to the superintendent of schools contains an idea so pertinent in this discussion that the letter will be quoted.

DEAR SIR:

I have four little girls attending your schools. I am up at five o'clock in the morning to get them off to school and to get myself off to work. It is six o'clock in the evening when I reach home again, pretty well worn out, and after we have had dinner and have tidied up the house a bit, it is eight o'clock. Then, tired as I am, I sit down and teach the little girls the lessons your teachers will hear them say over on the following day. Now, if it is all the same to you, it would be a great help and favor to me if you will have your teachers teach the lessons during the day, and then all I would have to do at night would be to hear them say them over.

Tactfully requested in this letter is the efficient direction of the learning process while pupils are under the influence of the one best qualified to give that direction. In another sense, the teacher's time can be most valuable if she uses it in promoting learning rather than in checking to see if learning occurred outside of class hours. The old notion, yet ever present, that the major responsibility of a teacher during class time is to test for results from study outside of class periods must go by the board. About the only way to rid teaching of this inefficient but perennial practice is to secure from prospective workers in the field of instruction a better understanding and appreciation of psychologically sound activity. Criticisms cannot accomplish it. One teaches as he understands; if he does not understand, then understanding must be secured before improvement results.

Values in independent study.—Anyone who has truly learned realizes full well that his best learning occurred when he figured and planned and thought for himself, when he did something alone, when he put his own shoulder to the wheel. He was twice blessed; he gained in knowledge and he gained in power to work and study independently. Who is it that knows most about plants, machines, geometry, history, fiction, and science? Who is it that is in a position to know more? Is it the pupil who has been tied to his teacher's apron strings, or the pupil who has grown to rely upon himself? There is no room for debate over choice. One choice produces the state of depending upon someone else; the other choice promotes an education which has for its purpose the gaining of abilities by the exercise of independent and self-directed activities in study. The way and the extent to which a pupil uses his mind are determined largely by the teacher; therefore, the teacher is obligated to direct the use of that mind so that the pupil, by employing study activities of the highest personal and psychological value, develops himself in fullest measure. Such is the philosophy and psychology supporting independent study.

Marking time during class period.—An illustration of a typical practice which consumes class time for the reiteration of materials will help in the visualization of a classroom where no independent study is observable. The illustration could be taken from any subject field, but geometry will serve the purpose admirably. Yesterday two theorems were assigned; today the class convenes and the pupils count off, one, two, one, two, etc., until everyone has counted. Number one's write out the first theorem on the blackboard, and number two's write out the second theorem. After this, each pupil gives the proof for his theorem; this practice continues until each pupil gives the proof for his theorem or until the end of the period draws near, when two more theorems are assigned for tomorrow. If somebody in this class knew the two theorems before the counting-off began, how much would he learn during the period? If all the others knew the two exercises, how much would they progress? Obviously, there is not much growth when one does over what he already can do well. Even

those who do not know, just listen; if they get anything, it is the product of another's labor which they gullibly memorize and do not understand and will soon forget. That period is lost when pupils' growth is as far advanced at the beginning as it is at the close. Surely ways can be found to correct the wasteful practice of marking time during class periods.

Providing for study in school.—As a reaction against home study for the preparation of lessons to be recited in school, a number of provisions have been devised to shift more responsibility for study to the school. The most common provision is to reduce recitation time and set aside a part of the class period for study, and the portion of the time set aside for study is known as the supervised study period. Occasionally, a whole class period is set aside for purposes of study in classrooms, or there are free periods during which pupils study in the library or in some large room or hall within the building. Usually some person is in charge of the study hall to maintain order.

In making provisions for study during school hours, many instructors believed contentedly in the division of time as the solution, so there came the practice of allowing so much time in each period for study. Often high-school principals were so enthusiastic for the supervised study period that bells were sounded to notify teachers of the arrival of study time. Teachers themselves often believed the division of time alone brought forth magically the growth of independent study powers.

A few words of caution need to be posited now, and these words are directed to those who have a lofty feeling that accompanies a theoretical idea, a feeling of smugness in the idea alone as complete and sufficient in itself. Growth through directed study comes about by real mental effort; one gains power only as he works to gain such power. Dividing periods or setting aside periods for supervised study is only a beginning in initiating study, and the quality of study may be just as poor and ineffective as home study or any other kind of study. A time and a place to study are no gilt-edge securities. Before pupils become independent learners much application is required, and teaching must concern itself with the gradual inculcation of the steps and proc-

esses leading to this power of independent and individual study desired in those taught. Before the desired power is obtained, definite and continuous exercise in power-producing situations is needed.

LEARNING THROUGH STUDY

Two meanings are associated with study: (1) one denotes study in school during stated times in which learning is carried forth by individual work rather than by recitation, lecture, socialization, the question procedure, or other forms characterized by group participation, and (2) the other meaning is associated with teaching pupils how to study. It is the first of these two meanings—the supervised study concept—that will be considered next.

Studying independently is one form of self-activity which should be predominant in secondary schools because pupils have the necessary tools of learning and because independent study is or should be the most profitable form of learning activity. However, as other profitable ways of influencing learning have been overlooked or mechanically applied, and as other sound methods have been wastefully and ineffectively managed, so have the possibilities in supervised study been shamefully neglected. Even today many teachers can see nothing more fundamental in teaching than the recitation-testing performance; and they reluctantly allocate any portion of class time to some other procedure, even to one so latent with genuine potentialities as individual study, the ultimate end of all training. And many instructors who do believe in study as a way to learn during school hours consider the activity as only a time allowance and make no serious effort to help pupils utilize their study periods most profitably. Such reminders as "You can have the rest of the period for study, so get busy"; "Get down to business, now, and study"; "Get out your books, it's time for study"; and "You didn't prepare your lesson, study until you do know it" denote teacher failures in preparing the way to worth-while study. The principles of teaching never stop, and they should be fulfilled as faithfully and intelligently in preparing the way to study, during study, and

following study as they are in any other phase of work influencing pupils' progress. The responsibilities of a teacher in making supervised or directed study periods fruitful now demand urgent deliberation.

1. *Assignment.*—Although emphasis will be placed upon study in school, some of the steps apply equally well to study at any other time, and especially to preparation for study which is accomplished through a good assignment. The assignment, if properly developed, creates mind-set through a gripping approach, gives the objectives, suggests methods of attacking the work, and provides study and work materials. Previously, these phases were developed in connection with the chapter on the assignment, but an additional assignment and a few comments by the person who made it will produce a deeper impression. While reading the following assignment, place yourself in a learner's position and feel how well you are prepared to begin effective study:

An adequate assignment informs the pupils concerning what is to be done, how to undertake the task, the standard of achievement expected, and the references in which to find material. The assignment should contain the lesson title, the study topics that are to serve as the basis of sustained recitations, a number of thought questions or problems on the most significant aspects of the lesson, and definite references to varied types of material. The following assignment, which was preceded by a lesson on "Early History of the Tariff," will serve as an illustration:

SOUTH CAROLINA AND NULLIFICATION

A. Study Topics
   I. Grievances of South Carolina
   II. The Webster-Hayne Debate, 1830
   III. The Tariff of 1832 and the Ordinance of Nullification
   IV. Action of Jackson and Congress

B. Study Questions
   1. How did a debate on western lands lead to a discussion of nullification by Hayne and Webster? (This is a hard question; can you solve it?) What, in your opinion, was the chief result of the Webster-Hayne debate?
   2. Summarize the argument justifying nullification; the argument against it.
   3. In the struggle between South Carolina and the National Government which won? Are you sure?

C. Study References
   I. Fite, *United States History*, pp. 270–73.
      Muzzey, *American History* (revised), pp. 229–31.

II. West, *American History and Government*, paragraphs 304–7.
Halsey, *Great Epochs*, Vol. 6, pp. 20–30 (from Roosevelt's *Life of Benton*).
Fish, *American Nationality*, pp. 197–208 (for those wishing a thorough, but rather difficult account).

Under the plan set forth the teacher first distributes the mimeographed sheet containing the assignment for the next day with such comments as may be desirable concerning the method of attack, the points deserving emphasis, the standards to be attained, notes to be taken (if any), and the character of references. In the assignment given above pupils were expected to study at least one reference in each of the two groups (shown by Roman numerals). It should be added that the citation of references by groups, plus the requirement just mentioned, gives variety to recitations, leads to wide reading, and enables a small number of books in duplicate to serve a large number of pupils.[1]

Several features of the assignment as effective influences upon study require special mention.

a) The question, whether oral or written, is a study determiner. On one occasion study questions in mimeographed form were handed out, and an observer watched the study reactions. One boy, in reading the text to find an answer to the first question, "Who founded Georgia?" ran his finger along the lines on one page and continued this movement until he covered the section on Georgia; not finding the item, he started at the end of the section and came back to the beginning. The observer asked the boy why the reading was done in that fashion, and the boy said he was looking for a man's name in capital letters. Questions should be so constructed that the best study procedures are brought into operation. Examine the questions in the assignment by Hill and feel how real study and reflection are demanded and how organization during reading is necessary to meet the demands. Questions determine how one studies because the objectives desired are either facts and items, or they are causal relationships, understandings, and significant meanings; if facts and items are desired, pupils glean the pages for names and dates; and, if understandings and meanings are demanded, pupils study accordingly. Writing out a question does not necessarily make it

[1] Howard C. Hill, "The Supervision of Social Studies," chap. vii of *Supervision of Secondary Subjects*, eds. Uhl *et al.* (New York: Appleton-Century Co., 1929), pp. 315–16.

any better than an oral textbook-recitation question. The purpose of the question is the determining factor.

b) The assignment specifies what results are expected. Before study is undertaken there should be something to study, to find out, to solve. One is not motivated to begin or continue study just for the sake of doing something.

c) Study can be directed so that the development culminates in the essential understanding of a logical division of a unit or a complete unit.

d) In the assignment emphasis can be given to study procedures, and aims of signal importance can be stressed.

2. *Diagnosis of difficulties and their correction.*—The assignment when well made creates the desire to do or to know, sets forth the objectives, and directs the processes to be employed in attaining the objectives. The questioning procedure or some form of direct teaching develops viewpoints, ideas, and insights which are difficult or impossible for pupils to get without the teacher's guidance and direction. When the learning has been thus aided, there can be no wiser choice remaining than to have pupils apply their powers in the next step, namely, growing more through self-directed study. And there is no law of teaching which prevents this further and forward movement in learning during class time. There are ideas of good teaching which do urge one to send learners onward when these learners are ready and eager and prepared to go on under their own power.

If, in the geometry class described previously, all pupils know the two theorems, then the continuous rehearsal of the known becomes tedious and profitless. Should all the pupils be forced to follow and pay attention to the one who has the proof to make at the blackboard, no matter what he says or how slow or dull he is? No, emphatically, no! James may have some trouble, but that trouble is his own. Every other one in class may have passed this point without interference, and to keep the others attending to something that does not need their attention is thwarting their patience and progress. The same difficulties do not come simultaneously to all pupils; troubles come at different times and in different places. In this classroom is the psychologist, the one

who is able to diagnose weaknesses and to suggest the psychologically sound activity needed as the remedy. While the person trained to analyze mental operations does this highly scientific work for some pupils, the others proceed undisturbed. During the time pupils are thus engaged in developing themselves educationally through their own efforts, the teacher will assume the important responsibility associated with the diagnosis and correction of those difficulties impeding the achievement of individual pupils.

A good diagnostician will first center attention upon the probable causes of the difficulties, for by so doing his correction will be immeasurably more pointed and effective. What may some of the difficulties be? Vocabulary deficiencies, reading difficulties, lack of perseverance, inability to recall past experiences and information, inability to visualize, hasty conclusions and snap judgments, wrong applications, poor study procedures, poor experiential backgrounds, lack of discrimination, and poor organizing ability are common causes of learning inabilities. The discovery of these weaknesses in the study of individual pupils is the first responsibility in assisting pupils to progress during directed study periods.

Discovery is closely linked with the remedy, and the remedy is the directing of learners into activities which will remove difficulties. The words "directing of learners into activities" have a significant connotation; the meaning implied is that the teacher does not remove the difficulty by actually doing, herself, but by directing pupils to do it for themselves. Miller gives, in his excellent book on directing study, a vivid account of his part while directing pupils in study. So appropriate here is his account that a portion of it will be included:

> These notes are transcribed from the teacher's pad. They indicate just what he said to pupils during the last two days of the challenge. The number of the exercise was noted and the suggestion or hint or question is recorded. In parenthesis, now and again, the nature of the pupil's difficulty is indicated. The pupil describes his dilemma. The teacher observed the injunction of not talking too much. The pupil upon the suggestion went to his seat or to the board and in all these cases below succeeded in demonstrating his exercises.
>
> RUTH: "Try to use supplementary angles."

MARGARET: (A defective figure.) "Draw your figure with your instruments."

OSCAR: "Talk to your figure."

TOM: "How did you draw line *AB*?"

FRANKLIN: "Can you see an hypothenuse in your figure?"

M. and C.: "Work on the size of angles (in degrees)."

H.: "Keep one finger on page 62." (A page of summary directions.)

J., A., and FR.: (Working in a group. Heated debate. FR. presented one solution of an exercise, J. and A. another. J. and A. were pointing out the errors in FR.'s reasoning.) "Soft pedal it over there."

HALVOR: "Can you make any use of exterior angles?"

WM.: "Supplements?"

A.: "Review exercise 120 and try to use it."

WHOLE CLASS: (Five minutes.) "Here is an algebraic way of working certain situations you will all need to employ now and again." Explanation and drill.

If (1) a equals c and (2) b equals d and if (3) a plus c equals b plus d, then a plus a equals b plus b (by substituting for c its equal a, etc.).

Then $2a$ equals $2b$.

Then a equals b.

Similarly c may be proved equal to d.

"Now apply the principles of this solution to your geometry."

L.: (Confused as to hypothesis.) "Read your exercise and trace it in your figure as you read it."

S.: "Apply axiom I to your congruent triangles."

LO.: "Surely, any side of the triangle may be your base."

T.: "Makes with the base an angle? Read it and trace it in your figure. Dwell on it."

O. and H.: "Use another fact stated in your hypothesis. Examine all the data given. Plan a general way of attacking it."

U.: "Tut, tut! You used your conclusion in your demonstration." (Oh, she says. A very common expletive in this procedure.)

A.: "Try to think exercise 128 and 131 together." (One is converse of the other.)

M.: (Difficulty in seeing related parts in overlapping figures.) "Separate the triangles. Draw them out aside and look at them."

M.: "Try drawing bisector of angle. Go back to exercise 119."

H. and O.: "What did we work out together yesterday?" (The algebraic way of getting quantities equal.) "Apply it here."

H.: "Keep one eye on page 59. Something on that page for you. Select two triangles in your figure. You may draw construction lines, you know."

R.: "Where is *MN*? I don't see it. Be sure to get all of the facts in your hypothesis. Read it carefully." (Oh, I see.)

K.: "What kind of triangle have you?"

C. and F.: "Select at once triangles which include any parts of your conclusion." (I spent two hours on this one. I have it.) "Fine."

I.: "How many sides has a triangle?"

G.: "Rub it out, line *HF*, and try to use exterior angle."

H.: "Why are those lines parallel? Go back to page 62." (Summary.)

R.: "All right so far. Now show what the nature of angles *a* and *c* is."

FR.: "Read your angle there again and point to it as you read it." (Oh!)

J., M., and I.: "Try to apply this principle: *a* equals *c*; *b* equals *d*. Then *a* plus *b* equals *c* plus *d*. Do you see it now?" (Oh, yes.)

G.: "Turn to page 59. There is something there you can use."

F.: "Go to board and draw with instruments the kind of triangle you want here. Do it quite accurately."

R.: "Suppose you abandon trying to prove figures congruent. What are your alternatives now? Correct. Now which one can you use?"

These are typical hints, helps, questions, directions, etc.[2]

In following through this actual picture of directing study, one notices the simultaneous discovery and correction of weaknesses. Pupils, by their questions and designation of points troubling them, indicate directly their weaknesses, and for these weaknesses remedial steps can be planned. From pupils' responses, be they in written work, development work, examination, or discussion, the teacher learns the status of the pupils, and the personal data collected serve as a basis for corrective treatment. So the task of discovery and direction goes on continuously; it is the everlasting duty of a teacher to learn all she can about her pupils so that her assistance to them may be most complete and most effective.

It must be remembered that the teacher does not stop teaching during supervised study, not at all; her teaching continues, but for the most part it is focused upon one individual at a particular time, or possibly several individuals, while the remaining pupils progress at their own rate. The observation of pupils at work, the examination of their written exercises, the analysis of their methods of preparing the lesson, and the collection of information about pupils are parts of diagnosis and the basis of remedial help. There will be short conferences with pupils in which the teacher takes the initiative because the pupils might be unaware of their shortcomings. At times pupils will come with their problems and questions and difficulties. At other times the whole class may be called to consider some common difficulty, or to discuss collectively some new viewpoint or method or procedure, or to be assisted by demonstration or visual representations.

[2] H. L. Miller, *Directing Study* (New York: Charles Scribner's Sons, 1922), pp. 121–24. The book is stimulating and sound. Chapter iii is especially valuable.

3. *Psychological time for study.*—Directed study should come at a psychological time, not clock time. Some subjects admit of more learning through self-study than do others, and to impose the same time requirements upon all learning violates the fundamental usefulness of the types of learning as applied to different aims. The teacher is best qualified to decide when independent study can be undertaken as the most effective form of activity. Surely the nature of the learning situation should be the sole criterion for the particular form of mental processes to be set into operation. At times the assignment may be a whole period in length; inductive teaching may extend over a full class hour or more. Development by the questioning method may last for a complete class meeting. Any one of these may be most influential upon learning during a certain time, but, when the background has been prepared so that pupils are in a position to grow most profitably by the exercise of their own powers, then the time is favorable for self-improvement through self-directing study.

At all times secure from pupils a full measure of their capacity to grow by their own efforts. Keep the learning processes balanced as determined by the nature of good learning, on the one hand, and the nature of pupils' capacities, on the other. There may be occasions when directed study is out of order, and on other occasions it may be most fitting; a knowledge of how learning takes place must guide one to decide when independent study is most propitious, because there are no red and no green lights automatically regulated.

4. *Progress to be indicated.*—During and following independent study there is the natural longing to know how well one is progressing. In some fields progress is more easily discernible than in others, but in every field tangible evidence of advancement and the degree of advancement can be indicated. In mathematics the correct solutions for problems are evidence of progress; in cooking or sewing the finished products are evidence; in music the performance is the evidence. The evidence thus far enumerated affords very concrete measures of the progress made, but in other fields, such as English, history, science, and foreign languages, the evidence may be less tangible; never-

theless, means should be devised to discover achievement. In teaching, one of the first and most important places to begin in the discovery of evidence is to provide assignments so planned that the aims forthwith denote the achievement expected. One is justified in stating that more time should be devoted to the construction of assignments which set up objectives to guide learning, for in this way the battle is more than half-won; the converse of this is the slovenly planned assignment, followed by much expenditure of time in quizzing to determine how well the indefinite aims have been definitely realized. Aims clearly stated foster clear and directed study.

Opportunities to inform learners of their progress come to the alert instructor constantly. Individual conferences, observation of pupils at work, examination of maps, notebooks, outlines, experiments, and other products convey evidence of progress which the teacher can evaluate in the presence of her pupils. Group discussions after extended study provide an opportunity to determine the status of achievement, to discover points needing more study, and to emphasize the standards of progress desired. Tests at the end of appropriate subdivisions of a unit or a complete unit provide measures of achievement. All these means can be utilized to indicate the progress made by pupils during their study or after study is completed.

5. *Subsequent demands as influences upon study.*—In a particular class the teacher based her questions on the paragraph headings, as, for example, "What does the author say under the heading: 'Psychological Time for Study'?" One day a substitute teacher was in charge, and he asked a question. The pupil who answered brought in materials and ideas from several headings, and, then, another pupil objected strenuously because the one who answered got outside the material under a particular heading. This case shows that pupils study for a purpose, and too often the teacher's purpose becomes the pupils' purpose, that is, pupils study to meet the demands of the teacher. Well, pupils must be given credit for showing intelligence; any person with tact and common sense would try to satisfy his superior officer, to gain his good wishes and commendations, and to win recogni-

tion and reward, especially so if the superior officer is a teacher. But the sad part is that the study of pupils is seriously devitalized if the purposes stressed are detrimental to good study procedures. Succinctly stated, whatever the teacher's demands are, pupils study to satisfy them. Even graduate students in college will make every effort possible to get old examinations in the attempt to discover what kinds of questions or exercises the professor is likely to include in the final.

Subsequent demands are the evaluations made after study is over. Most common among these demands are the questions during socialized recitation, the quizzes and examinations, the reviews, problems, performances, floor talks, and oral and written summaries.

One public speaking instructor says that making a speech in public will be his final examination, and another notifies his students that the final will include one hundred true-false items. It is relatively easy to visualize the difference between the study processes the two groups will follow in meeting the demands of the instructors. The teacher's standards become pupils' standards. If questions are factual, study for facts ensues; if examinations are specific item after item, then memorization of items is inevitable; if paragraph headings are the stimuli, responses confined to definite places in a textbook come forth. Pupils are followers, but they can be followers of things most worth while as well as followers of things least worth while. They can study to secure broader interpretations, deeper meanings, and unitary developments as well as to secure items, facts, and fragments, provided there is continuous emphasis upon and direction of learning situations which draw out the right kind of study to meet demands. And demands begin in the assignment and continue through every part of teaching until the learning is comprehensive, unified, and complete.

TEACHING PUPILS HOW TO LEARN THROUGH STUDY

A major factor in directing learning is teaching pupils how to learn through study. Some persons advise that a special course in this phase of instruction be given to all high-school Freshmen

by an expert in the field. It seems, however, that the acquisition of the ability to study cannot be divorced from study itself; every teacher must consider how to study as an aim while directing study in connection with her subject.

Unfortunately many teachers fail to realize that the development of power as an efficient reader in specific fields is one of their major obligations. In a study which is now under way pupils who were failing in given subjects were referred to a special teacher for remedial work in reading. An examination showed clearly that these pupils had mastered the fundamental habits of reading. Their failure was due to the fact that their teachers had not interested them in the subjects they were teaching, had not stimulated them to think actively while reading, and had not given them the instructions, directions, and training that were necessary in order to achieve the broader purposes of reading in those fields. The fact cannot be emphasized too vigorously that the teacher of each subject is to a greater or less extent a teacher of reading. One of his major responsibilities in this connection is to continue the development and refinement of general reading habits and to emphasize particularly those attitudes and habits that characterize an intelligent and efficient reader in the subject which he teaches.[3]

Learning how to study comes from actual study, not from hearing or memorizing rules about how to study. One rule of study is: Concentrate while you study. Psychologists have stressed the importance of learning by doing; but, in applying the principle, many teachers see learning by doing as memorization of a rule of study, and so the rules, concentration being among them, are mimeographed or printed and given to pupils in the hope that the rules will be read, memorized, and followed. To concentrate during study cannot be memorized into one's learning habits; it can become an ingrained method of work only by actual concentration during study. One does not become healthy by memorizing health rules; he becomes healthy by living out the rules in everyday life. In learning to study, the application activity counts; memorization of rules without the practical exercise of them is vain hope.

Causal relationship between teaching and study.—To expect pupils to develop the best procedures in study without any reference to the kind of study called into operation by the teaching

[3] Department of Superintendence, *The Junior High School Curriculum: Fifth Yearbook* (Washington, D.C.: National Education Association, 1927), p. 131.

is expecting the impossible. Pupils soon find out what teaching demands. If teaching does not demand thinking and organization, there is little value in giving rules such as: "Think out the relationship between events"; "Do not try to memorize everything"; and, "Go over the lesson and try to see it as a whole and how the parts make up the whole." A good rule of study in solving problems is: Judge the reasonableness of the answer, before and after the problem is solved. How much will 5,995 pounds of coal cost at $10 per ton? If this problem is given to a group of Seniors in high school, any answer from $0.10 up to $100.00 can be expected. You say to the group, "Check your work before I ask you to hand in your papers." What do they do? Well, they look at their addition, their division, their pointing-off, and yet, when the papers are corrected, about the same range in answers will be found. The Seniors revert to mechanical means of checking; they try to remember rules for pointing-off, etc., not once thinking of the reasonableness of their answers as checks; there is no fundamental idea of the realities of the problem to pull their operations into line; they proceed along mechanical lines. Now, 5,995 pounds equal approximately three tons (just a trifle less), hence three tons at $10 should give an answer of about $30 (a few cents less). Why did not the Seniors do that judging? There is one logical reason: they had never practiced that judging in the solving of problems. The moral in teaching how to study is: Make teaching such that it demands the use of the best methods of study. See that the methods are employed by pupils while they study, and the best way to do that is to have the teaching pull these best ways into operation. No great stretch of imagination is needed to see how teaching could demand the judging of the reasonableness of answers in solving problems. Benezet's account of two ways of teaching arithmetic shows how training makes a difference in the ability to solve original problems:

I give verbatim accounts of two of these recitations, the first from a traditional room and the other from one of the experimental groups. I drew on the board a little diagram and spoke as follows: "Here is a wooden pole that is stuck in the mud at the bottom of a pond. There is some water above the mud and part of the pole sticks up into the air. One-half of the pole is

in the mud; 2/3 of the rest is in the water; and one foot is sticking out into the air. Now, how long is the pole?"

FIRST CHILD: "You multiply 1/2 by 2/3 and then you add one foot to that."

SECOND CHILD: "Add one foot and 2/3 and 1/2."

THIRD CHILD: "Add the 2/3 and 1/2 first and then add the one foot."

FOURTH: "Add all of them and see how long the pole is."

NEXT CHILD: "One foot equals 1/3. Two-thirds divided into 6 equals 3 times 2 equals 6. Six and four equals 10. Ten and 3 equals 13 feet."

You will note that not one child saw the essential point, that 1/2 the pole was buried in the mud and that 1/3 of this half equaled one foot. Their only thought was to manipulate the numbers, hoping that somehow they would get the right answer. I next asked, "Is there anybody who knows some way to get the length?"

NEXT CHILD: "One foot equals 3/3. Two-thirds and 1/2 multiplied by 6."

My next question was, "Why do you multiply by 6?"

The child, making a stab in the dark, said "Divide."

It may be that he detected in my voice some stress on the word "multiply." I then gave them a hint which, had they been able to reason at all, should have shown them how to solve the problem. "How much of the pole is above the mud?" said I. The answer which I had hoped for was, of course, "One-half of it is above the mud."

The first child answered: "One foot and 2/3."

I looked dubious, so the second child said, "One foot and 1/3."

I then said, "I will change my question. How much of the pole is in the mud?"

"Two-thirds," said the first child.

"One-half," said the second.

"One-half," said the third.

"Then how much of the pole is above the mud?" said I, thinking that now the answer was plainly indicated by one-half.

"Two-thirds," said the next child.

"One foot and 2/3," said the next.

"One-half of the pole is in the mud," said I. "Now, how long is the pole?" and the answers given were "Two feet." "One and one-half feet." "One-half foot." "One foot." "One foot." "One foot," and I gave it up.

I gave the same problem the same week to a fifth grade in our city which had been brought up under our new curriculum, with no formal drill in addition, multiplication, and division of big numbers but with much mental work in reasoning. I drew the diagram again and said, "Here is a pond with a rock bottom and mud and water, with a pole sticking in the mud. One-half of the pole is in the mud; 2/3 of the rest of the pole is in the water; one foot of the pole sticks up in the air above the water. How long is the pole? How would you go to work to do that problem?"

FIRST CHILD: "You would have to find out how many feet there are in the mud."

"And what else?" said I.

ANOTHER CHILD: "How many feet in the water and add them together."

"How would you go to work and get that?" said I to another child.

"There are 3 feet in a yard. One yard is in the mud. One yard equals 36 inches. If 2/3 of the rest is in the water and one foot in the air (one foot equals twelve inches) the part in the water is twice the part in the air so that it must be 2 feet or 24 inches. If there are 3 feet above the mud and 3 feet in that mud it means that the pole is 6 feet or 72 inches long. Seventy-two inches equals 2 yards."

It amazed me to see how this child translated all the measurements into inches. As a matter of fact, to her, the problem was so simple and solved so easily, that she could not believe that she was doing all that was necessary in telling me that the pole was 6 feet long. She had to get it into 72 inches and 2 yards to make it hard enough to justify my asking such a problem.

The next child went on to say, "One-half of the pole is in the mud and 1/2 must be above the mud. If 2/3 is in water, then 2/3 and one foot equals 3 feet, plus the 3 feet in the mud equals 6 feet."

The problem seemed very simple to these children who had been taught to use their heads instead of their pencils.[4]

Those children under the new curriculum in Benezet's experiment were given training in observing the environment, judging dimensions and proportions, dealing with realities, and experiencing relationships. As a result they used their gained experiences in reasoning out problems, whereas the children under the traditional curriculum juggled numbers as a way to find answers. Knowledge of realities pulls the correct mathematical manipulations into line. In another experiment it was found that pupils could work the problem, "How much will five rabbits cost at fifteen cents each?"; but, if a problem like this was given, "What will five kilowatt hours of electricity cost at fifteen cents each?" the pupils encountered considerable trouble and their errors were much more numerous. If experience is a determining factor in solving problems in mathematics, then by all means the gaining of experience as a study procedure in that field should be fostered.

All teachers involved.—Improving the ability to study is the concern of teachers in all subjects or areas. This idea is well expressed by Traxler, who writes as follows:

Among the kinds of study procedures which have been emphasized in how-to-study courses are note-making; outlining; reviewing; preparing for

[4] L. P. Benezet, "The Story of an Experiment," *Journal of the National Education Association*, XXV (January, 1936), 7–8.

examinations; learning the principles of study, including memorizing and remembering; selecting and organizing subject matter; increasing knowledge of word meaning; improving reading comprehension; adapting speed of reading to the material and the purpose involved; preparing a term paper, theme, or report; identifying and expressing cause-and-effect relationships; and using procedures appropriate to different areas of study.

The last kind of instruction—using study procedures appropriate to different areas of study—is especially important. While helpful suggestions along this line can be made in a course on how to study, by far the most effective instruction in study methods for different fields can be given by instructors in those fields in connection with the regular subjects taken by the students. In fact, if a school's program of improvement of study is to reach its highest effectiveness, it is imperative that the co-operation of the instructors in the various subject fields be secured.[5]

Good study habits are gained by studying in the right manner. Every instructor should feel responsible for developing the best study procedures in connection with the subject taught, and the most effective way to develop these procedures is to set the stage so that the teaching demands the use of them. Merely putting a set of study suggestions in the hands of pupils will not suffice; ideal study habits are gained and lived out only through study which requires the use of correct procedures to attain designated objectives. First, the teacher, we shall assume, knows the correct ways to study a subject, and, second, she directs learning so that the correct ways are employed in study. If history is the subject taught, the study methods are kept in mind by the teacher, and then the teaching is planned to bring into operation the study habits. These two phases of teaching how to study are illustrated next.

Teaching how to study history.—Ten good procedures in the study of history are these:

1. Have the general aim clearly in mind. What is it that is to be understood? An understanding of a problem, an issue, an era, or historical development is the aim.
2. Discover the supporting parts or subdivisions of the problem or unit.
3. Select the essentials in the subdivisions. Each subdivision has a number of factors which, taken as a group, compose the subdivision.

[5] A. E. Traxler, "The Improvement of Study," *School Review,* LIII (May, 1945), 289.

4. Relate the subdivisions; see the cause-and-effect relationships. It is the causes in one division that are effects in the subsequent division, and then the effects become causes for the following division.
5. Be sure that each meaning is genuine before passing on to another phase. The part missed may cause misunderstanding later.
6. Live through the growth of the general aim. One's experiences and feelings give direction to the growth and development of the problem or unit.
7. If geographical percepts or information will add perspective, consult maps.
8. Look up words that are not understood.
9. Consult references for the purpose of supplementing the text. References supply details, sidelights, and new viewpoints not given in the brief textbook discussion.
10. Finally, trace mentally the important stages in the growth of the understanding. Feel the satisfaction of knowing that you know.

The ten study activities illustrated.—The ten activities in study must next be brought into actual operation through the learning exercises planned by the teacher. It is the pull of these exercises that brings the right study procedures into line.

1. Awareness of the general aim is usually produced in the assignment by the proper kind of approach and presentation. For example, the Monroe Doctrine can be selected as the issue or problem to be studied. An approach might begin with this question: "Why are South and Central America composed of independent countries with a few minor exceptions, while almost all of Africa is owned by European nations?" A map showing the territory in Africa held by other countries can be shown to impress the fact. Opinions can be offered as to why the differences in ownership came about in the two continents. When the right idea or one near enough to the real cause is proposed, the policy of this country can be formulated, not in detail, but in a general way. The understanding to be secured can then be presented and pupils made aware of it.
2. By a logical process of discovery, the sequence of the subdivisions which culminate in the final understanding can be derived. Sometimes this discovery of supporting parts or subdivisions can be done co-operatively, that is, both teacher and pupils attack the problem in a logical way. Causes bringing about the Monroe Doctrine, the provisions of the Doctrine, attitude of other nations toward it, and the Doctrine from that time until today seem to be subdivisions of logical sequence.
3. A study of the divisions is now in order.
4. The causal relationships between the subdivisions can be figured out by the pupils themselves, but occasionally study sheets or written assignment suggestions facilitate the tracing of relationships. Real and contemplated colonization and intervention by foreign powers became

causes for the Doctrine, and the Doctrine in turn caused other nations to look upon the Doctrine in a particular way. The fourth subdivision—the Doctrine from that time until today—will be most difficult. Study questions such as the following prove helpful: Why is Washington's "Farewell Address" often quoted in connection with discussions of our relationships with foreign nations? Did any European powers ever attempt to violate the Doctrine? Did the United States disregard the Doctrine by becoming involved in World Wars I and II? Why did the United States Senate reject Woodrow Wilson's urgent demand that this country join the League of Nations? Will the United Nations probably work out a plan of world jurisdiction that may make the Doctrine obsolete?

5. Often meanings are overlooked because memorized words are taken as sufficient evidence of learning. Sometimes meanings can be partially treated during the assignment. In a study of the Monroe Doctrine such concepts as "the Holy Alliance," "political system," and "intervention" should be developed sufficiently to provide enough momentum so that learning need not be blocked by the misunderstanding or lack of interpretation of the terms. If the meanings can be secured through reading, then pointing out the terms will be adequate.
6. Pupils have experiences of their own similar to the ones passed through by groups of persons or nations; for example, there are troubles, some ways are thought out to eliminate the troubles, the ways are put into effect, and time tells whether the ways work out or whether new ways are needed. Living vicariously through the history of a period is an attempt to understand how history was lived through by persons in past periods. Such questions as, "Would you have done the same thing at that period?" or "Do you believe the course worked out was a wise one?" will connect pupils' feelings and experiences with the issues and problems of past generations.
7. Questions demanding geographical percepts and information impress pupils with the fact that map study is necessary to meet the requirements. Use of maps during class discussion also emphasizes the part played by percepts of locations, forms, territories, and possessions.
8. In addition to technical terms, many commonly used words must be known to secure correct interpretations. In looking over a few pages of a well-known high-school history textbook, I find these words appearing: "amity," "diplomacy," "incur," "obnoxious," "infallibility," "philanthropic," "repudiate," "stipulated," and "acquiescence." Constant use of the dictionary is needed to secure correct meanings and to develop a vocabulary.
9. The teaching itself is chiefly responsible for the outside reading habit. Pure textbook instruction produces reading habits of restricted scope, while teaching to develop full meaning demands reading of several sources. References should be provided, and, if possible, the books should be in the classroom so that study will become a way to learn during class periods.

10. Good oral summaries, floor talks, and examinations provide pupils opportunities to give the main ideas in logical sequence without going into great detail. It is the general aim which is to be expressed, and much of the assimilative material used in building the final understanding can be omitted.

Teaching how to study plane geometry.—If the teaching of good study procedures is connected with the subject as it is being learned, then it will help, in showing this relationship, to have some of the subject matter as a starting-point.

1. Two triangles are congruent if two sides and the included angle of one are equal to two sides and the included angle of the other.
2. If two angles of a triangle are equal, the sides opposite are equal.
3. If two opposite angles of a quadrilateral are equal, and if the diagonal joining the other two angles bisects one of them, then it bisects the other.
4. If two sides of a triangle are equal, the angles opposite these two sides are equal, and the triangle is isosceles.

A few study procedures which should be taught while the pupils learn geometry are these:

1. Subject matter: The historical growth of plane geometry, including its origin, uses, and applications, should be developed and stressed with the class. The two dimensions in plane geometry should be differentiated from the three dimensions in solid geometry.
2. Vocabulary: Full meanings of such words as "congruent," "quadrilateral," "diagonal," and "isosceles" should be gained when these terms first appear.
3. Sentence structure:
   a) *Conditional clause*: The conditions and facts are given in this clause which is generally introduced by *if*.
   b) *Conclusion*: This is the main clause and contains the conclusion which holds true provided the given conditions are considered.
   c) *Order*: The order of the conditional clause may be first or last in the sentence.
   d) *Common structure*: Giving the conditions and then stating a conclusion are common ways of constructing sentences. Either the conditions or the conclusion may be given first. You will get burned if you put your finger on a red-hot piece of iron. If you follow the directions, you will have no trouble.
   e) *Number of clauses*: It may require two or more clauses to give all the conditions (see theorem No. 3). The same holds for stating the conclusion (see theorem No. 4).
4. Problem-solving: Proving the conclusion requires careful reading to get the conditions and straight thinking to prove the steps leading to the conclusion. Personal opinion will not count. The facts must be presented.

5. Nature of proof: The processes of inductive and deductive reasoning should be explained and then learned through concrete experiences. A mathematics teacher should be a good psychologist; he should let pupils in on the workings of their minds and the minds of others.
6. Wide application: Mental processes used in the study of plane geometry can and should be applied to other kinds of learning. Careful reading, seeking of relationships, logical reasoning, taking stock, and suspending judgment are samples of good study procedures applicable to all courses. However, if the teacher fails to teach for that transfer, there will probably be no transfer to other areas.

So often it is the accumulation of little helps given now and then over a period of weeks and months and years that actually assume great proportions. A little stress on sentence structure, some help with reasoning, a point on the organizations of ideas, a little more attention to reading, more emphasis on meanings, and greater familiarity with the sources of materials are only a few illustrations of the numerous aids that would, if carried forward by all teachers in all subjects all the time, result in tremendous growth in power to study. Spasmodic outbursts and peppy campaigns at the beginning of the school year for the purpose of telling about how to study or the importance of study are merely "shots in the arm."

Training pupils to plan methods of study.—Since one objective of secondary education is to train adolescents to become independent workers, an aim in teaching should be the gradual development of proficient study habits. Independent study is the road to self-education. As a rule, one does not know how proficient his study is unless it is evaluated by a specialist. After one becomes aware of his deficiencies, he is in a position to correct them. The illustration of study relative to the Monroe Doctrine in which the teacher took the initiative in securing proper procedures can be reversed, and the methods of attacking and understanding the topic can become the work of pupils. After the study has been completed, an evaluation of the steps taken by pupils is, of course, necessary.

One way of evaluation is through group discussion, that is, the pupils relate how they attacked the problem, what divisions were considered, the significant ideas they included in the divisions, and other study activities they utilized. During the discussion

the teacher notes the development, evaluates the content and organization, and finally completes what she considers the best study procedures. The evaluation is socialized and co-operative, a conversational development in which an aim is stressed just as much as if it were an understanding, an appreciation, or an ideal.

Another method of evaluating is to have pupils make an outline of the topic or problem. An outline shows quite accurately what ideas of content and organization are in the mind of the one who does the outlining.

Still a third way of evaluating study is by means of conferences. This way can be utilized in individual instances after the first two do not produce adequate improvement. By having the pupil trace orally his study procedures, the teacher can discover the inner workings of the pupil's mind, and then she can strengthen the weaknesses found in the study processes.

Standards of good performance needed.—Probably too much time and energy have gone into efforts that are routine and mechanical in nature. On the contrary, one learns to study by attacking some enterprise which has enough in it to draw out processes needed to reach the desired development. More shaping up of standards of good performance in pupil's minds and more guidance in getting pupils to think on higher and higher maturity levels would help immensely in gaining the ability to study. What would you desire in this report, in this debate, in this composition, in this historical dramatizaton, in this summary, in this assignment, in this unit, in this biographical sketch, in this book report, and in this investigation? Such inquiries in planning would help young persons to develop standards of depth and value and thereby exert a wholesome directive force upon their work and study powers. The man who gives a good speech has standards in his own mind of what a good speech is and forthwith studies to meet or fulfil those standards. But the ideas of what a good speech is must precede the preparation of the speech; a few meaningless maxims or rules will not suffice. Most failures in how to study are actually failures in understanding what good performances are or what good standards might be. The debate coach who guides the class to think about

the authenticity of materials and the weight of authority and then insists upon high standards of authenticity and authority during debate is helping pupils to weigh and evaluate in their reading, to pick the wheat from the chaff, and to select and discriminate in their examination of available sources of information. Learning to study, like learning to ride a bicycle, comes from effort to reach standards of good and useful performance; in bicycle riding, however, the standards are everywhere observable, while study standards are difficult to observe and evaluate.

Effective study an important objective.—If objectives are attained through study, then directing learning must include directing study. Assisting pupils to grow through independent study is not a supplementary activity or a by-product of teaching, but it is an integral part of teaching. Study is a process, a development, an achievement; it should be considered an aim of highest value. The ability to study effectively and independently is learned through psychologically sound self-activity. Throughout this chapter emphasis has been placed upon the planning of learning situations so that the proper procedures in study are brought into active service in meeting requirements. How one studies determines the kind of study procedures he acquires.

APPLICATION EXERCISES

1. Is there any relationship between a teacher's study habits and the ones she will probably teach? Would she be likely to pay much attention to study procedures that she never used in her own study? What seems to be the first essential, then, before we can expect that study habits be taught and that the right ones be taught?
2. Examine your experiences in learning and determine what it was that influenced your methods of study. For example, did the objectives exert some pressure on your ways of working? Try to enumerate as many factors as you can that brought about better reading and study activities in your learning.
3. Do you have some ineffective methods of study? How do you believe they came about?
4. There are general and specific study suggestions appearing in books dealing with supervised and directed study. What six good suggestions can you propose which might apply to all study? What are the right ways to study science, mathematics, and foreign languages? Would the

effective ways of learning algebra be applicable to the study of geometry?

5. Explain what is meant by the psychological time for study. Do you think there are times when class periods might be given over to more effective activity than individual study?
6. Should all teachers in a school be regulated by the same division of time for study, that is, should each period be half recitation and assignment and the other half supervised study? Give reasons for your decision.
7. What principles of teaching are brought forcibly to the front in directing study properly? Show the relationship between the principles and the direction of study.
8. Should study always be thought of in connection with books? Is observation a form of study? Does the artist study during the process of painting a picture? Does the football coach study while the game is in progress?
9. Can a teacher do anything to improve home study, that is, if pupils are required to prepare lessons out of school hours? Explain.
10. Observe some individuals at work in a library. Some of these persons are looking around, smiling at friends, and observing everything that goes on in the library. Would you be justified in drawing any conclusions about their mental processes? Other persons are steadfast and stationary during study. Why? Is the ability to study a gift of the gods or an acquistion for which one pays the price?

RELATED READINGS

BOSSING, N. L. *Teaching in Secondary Schools,* chap. vii. 3d ed. Boston: Houghton Mifflin Co., 1952.

BRINK, W. G. *Directing Study Activities in Secondary Schools.* New York: Odyssey Press, 1937.

FREDERICK, R. W.; RAGSDALE, C. E.; and SALISBURY, RACHEL. *Directing Learning.* New York: D. Appleton–Century Co., 1938.

GRAY, W. S., *et al. Improving Reading in All Curriculum Areas.* Chicago: University of Chicago Press, 1952.

KELLEY, V. H., and GREENE, H. A. *Better Reading and Study Habits.* Yonkers, N.Y.: World Book Co., 1947.

MURSELL, J. L. *Using Your Mind Effectively.* New York: McGraw-Hill Book Co., 1951.

NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. *Reading in the High School and College: Forty-seventh Yearbook,* Part II. Chicago: University of Chicago Press, 1948.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chap. ix. New York: Appleton-Century-Crofts, Inc., 1948.

ROBINSON, F. P. *Effective Study.* New York: Harper & Bros., 1946.

WRENN, C. G. *Study Hints for High School Students.* Stanford: Stanford University Press, 1947.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension SERVICES
CALCUTTA-29

PART IV

INTRODUCTION

PART IV comprises a discussion of the last three principles: providing for individual differences, diagnosis and remedial teaching, and an ideal physical and social environment. These three were necessarily brought into the discussion while showing the possibilities inherent in means, as in the assignment and independent study, for teaching out the first five principles, but a more intensive treatment of the three is found in this part.

CHAPTER XIII

PRINCIPLE 6: TEACHING SHOULD PROVIDE FOR INDIVIDUAL DIFFERENCES

ANYONE who teaches in secondary schools soon notices great variations among pupils in every phase of learning. To differentiate in a general way these variations in capacity to learn, the terms "bright," "average," and "dull" are commonly used. In practice pupils do not fall nicely into some one of the three groups, but they shade off gradually from the best to the poorest as based upon one or a number of abilities. For example,

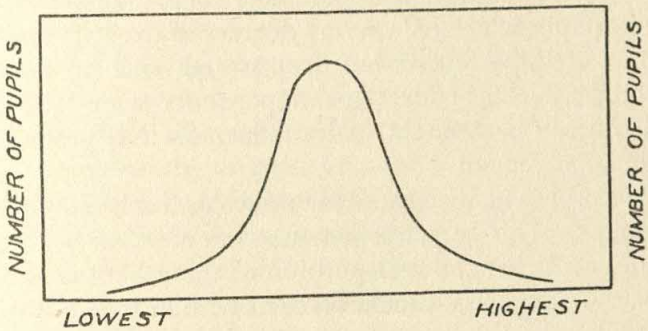


FIG. 10.—Scores: curve of normal distribution

if a large enough group of high-school pupils were tested on one hundred problems in the higher phases of arithmetic, the scores would range from very low to very high, and, if graphed, these scores would resemble a curved line, called the "curve of normal distribution" (see Fig. 10).

Of the hundred problems, some pupils would probably solve correctly as few as five or ten; a few other pupils would probably solve correctly as many as ninety or more. The remainder of the scores would be distributed between the two limits with the greatest number clustering at the place where the curve is the highest. If abilities are so widely divergent, the practice of re-

quiring that all pupils learn the same amount, in the same time, with the same degree of perfection, cannot square with the facts of variations among pupils. Good teaching must consider the variations and provide for them in some manner.

Of all problems that confront beginning or experienced teachers, no doubt the most trying are those problems arising from variations among members of a class. If learners could do equally well in all phases of school work, a program of instruction could be planned and carried forward evenly and effectively; but such an ideal condition in a class cannot be found. Individuals differ, and they differ considerably.

The factors giving rise to differences are numerous, but among the most important are heredity, home training, educational opportunity, health, nourishment, and environmental factors of one kind or another. When combined, these factors result in classes of pupils who have varying degrees of capacity and ability. Some of these factors are deep-seated, such as heredity, while others, such as educational opportunity, are not so deep-seated and can be brought under influences that produce immediate improvement.

If the purpose of the school is to develop each individual to the maximum of his capacity, then the work of an instructor must be so directed that the real purpose of the school is realized. Ideally, the differences should be dealt with in such a way that pupils will progress in accordance with their capacities to learn; yet it is not easy to put into practice an ideal that appears plausible on paper. At any rate, nothing is gained by dreading the difficult.

A typical class of twenty-five or thirty pupils has a noticeably large number of differences. Some of these pupils are relatively young, some are rather old for their grade in school; others are bright, very bright, while still others are dull, extremely dull; a few have had ideal home surroundings, a few have had to live under conditions far from ideal; the previous training of some has been thorough and fundamental, the educational opportunity of others has been spasmodic and ineffective; several pupils may be strong and healthy, sundry pupils may be undernourished and

sickly. So it can be seen that the differences pertain to intelligence, opportunity, training, health, moral stamina, social standard, and economic stability. If the differences pertained only to the intellect, the problem would be difficult enough, but there are so many additional traits and powers which enter into the problem that the solution becomes extremely entangling and perplexing. Now, these differences should be met in some satisfactory manner. It cannot be expected that all pupils should be held to the same standards because the capacities and traits and powers which enter into the acquiring of the standards differ so much in quality and quantity. What can a teacher do under the circumstances depicted in this class?

Possible solutions.—Much has been written about the possible ways or procedures to care for differences. Some persons maintain that the only way to proceed is to chart out the work, step by step, and then have each pupil do the work as fast as he can. When he has finished the unit or division of work under consideration, he moves on to the next unit or division. The pupil does not wait for others, he works as an individual; and, when he has completed the assigned amount he goes forward, regardless of the others in his class. He may finish a year's work in a half-year, or in two years, or in any amount of time. His progress is determined by his capacity to master the materials. This plan is generally characterized by calling it individual instruction. At the basis of individual instruction is a standard that each pupil must reach; and, once a pupil reaches the standard, he proceeds to the next block or assignment. Briefly, the essence of the plan is acceleration. It can be seen from the preceding discussion that the pupils in a class soon separate, that is, the class does not move on as a whole.

The second solution is to keep the class together, but to provide for differences by enrichment, that is, to give more and different materials so that the brighter or more able pupils learn more but do not separate from the class. The class organization is held intact.

A third solution has for its central idea the providing of projects so that each member can work up to his capacity by doing

more, or more difficult, projects. For example, a class in industrial arts can be regulated by having its members work on projects, such as constructing pieces of furniture, making cedar chests, or making any constructions related to the subject. Pupils, then, work as individuals; they can work up to their respective capacities.

A fourth solution is known as ability or homogeneous grouping. By various tests or criteria, the general capacities of the pupils in a particular school, or of those pupils in a particular grade, are determined, and then the pupils are placed into groups so that each group has pupils of nearly the same capacities. These groups are then kept together, and the work required of the respective groups is determined by the capacities of the groups. Bright groups do more, or more difficult, work than do the groups with less capacity.

In still other schools, administrators and teachers are devising and employing different means to meet the problem. Provisions range all the way from carrying more subjects or fewer subjects up to the provision known as pure individual instruction. In one monograph of the National Survey of Secondary Education, Billett gives a list of provisions used by schools which are attempting to provide for individual differences. The list includes the provisions in Table 1.

A few quotations from Billett convey information as to the use of, and success with, the provisions in secondary schools:

> In other words, the facts and theories concerning individual differences, which have filled library shelves to overflowing during the past quarter of a century are still reposing on library shelves, or echoing through the lecture halls of schools of education, much more generally than they are incorporated in the practice of secondary schools. No fact has been established more firmly by this study than the fact that comparatively few schools are making thorough provisions for individual differences. . . . .

> In other words, only one principal in four or five using any one of these plans has any considerable measure of confidence in its success.

> Later careful study of the 28 provisions for individual differences listed on the preliminary inquiry form has shown that the entire group may be reduced to seven categories, namely, (1) homogeneous grouping, (2) special classes, (3) plans characterized by the unit assignment, (4) scientific study of problem cases, (5) variation in pupil load, (6) out-of-school

projects and studies, and (7) advisory or guidance programs. Of the seven, the first three—homogeneous grouping, special classes, and the unit assignment—have been found to be core elements in a typical successful program to provide for individual differences. These three form a kind of trinity, a sort of three-in-one answer of the Nation's outstanding schools to the problem of providing for individual differences.[1]

TABLE 1*

FREQUENCIES WITH WHICH VARIOUS PROVISIONS FOR INDIVIDUAL DIFFERENCES WERE REPORTED IN USE BY 8,594 SECONDARY SCHOOLS

Provision	Use	
	Number	Percentage
1. Variation in number of subjects a pupil may carry	6,428	75
2. Special coaching of slow pupils	5,099	59
3. Problem method	4,216	49
4. Differentiated assignments	4,047	47
5. Advisory program for pupil guidance	3,604	42
6. Out-of-school projects or studies	3,451	40
7. Homogeneous or ability grouping	2,740	32
8. Special classes for pupils who have failed	2,612	30
9. Laboratory plan of instruction	2,611	30
10. Long-unit assignment	2,312	27
11. Project curriculum	2,293	27
12. Contract plan	2,293	27
13. Individual instruction	2,145	25
14. Vocational guidance through exploratory courses	1,911	22
15. Educational guidance through exploratory courses	1,900	22
16. Scientific study of problem cases	1,343	16
17. Psychological studies	1,077	12
18. Opportunity rooms for slow pupils	946	11
19. Morrison plan	737	9
20. Special coaching to enable capable pupils to "skip" a grade or half-grade	726	8
21. Promotion more frequently than each semester	686	8
22. Remedial classes or rooms	593	7
23. Adjustment classes or rooms	544	6
24. Modified Dalton plan	486	6
25. Opportunity rooms for gifted pupils	322	4
26. Restoration classes	191	2
27. Dalton plan	162	2
28. Winnetka technique	119	1
29. Other	101	1

*R. O. Billett, *Provisions for Individual Differences, Marking, and Promotion* (National Survey of Secondary Education, Office of Education, Bull. 17, Monograph 13 [Washington, D.C.: Government Printing Office, 1932]), p. 9.

[1] R. O. Billett, *Provisions for Individual Differences, Marking, and Promotion* (National Survey of Secondary Education, Office of Education, Bull. 17, Monograph 13 [Washington, D.C.: Government Printing Office, 1932]), pp. 9 and 11.

It would be an endless task to describe every one of the provisions fully, so the course to follow must be shortened. A logical way is to find the conditions under which teaching is carried forth, and then suggest means that will prove efficient in fulfilling the principles of teaching. If the theoretical means are too far removed from practical applications, there is usually no application. A teacher has limits in time, strength, and endurance. She is not a machine; she is a human being; she needs sleep and recreation as does any other normal person. Providing for differences often becomes the time-consuming and nerve-racking practice of correcting papers, notebooks, exercises, tests, and other written specimens of pupils' work far into the hours of night beyond the big numbers on the clock. So the theoretical plans must not be impossible of reasonable fulfilment; otherwise, the teacher becomes a mere manipulator of corrective devices, especially the red pencil.

SECTION 1. PROVIDING FOR DIFFERENCES IN MIXED CLASSES

An overwhelming majority of the classes in secondary schools are mixed or unselected groups. In these classes will be found pupils who possess capacities ranging from the highest to the lowest. In the face of these circumstances, it will be necessary for the great majority of teachers to devise ways and means to care for individuals in mixed groups. Furthermore, these groups will remain together, that is, the pupils will begin the course together and complete it at the same time; there will be no acceleration; each pupil will be studying the same unit or division of subject matter, and he will pass on to the next phase of the work with all the others in the class. To provide for differences in mixed or unselected groups is the problem deserving first consideration.

The assignment as the beginning-point.—Let us suppose that an assignment in terms of pages in a textbook is made to a class in which the capacities of the pupils vary. Let us also assume that each member of the class is held to the same standard of achievement, that he is expected to know as much about the ideas in those pages as everyone else, that he must get the ideas

in the same time, and that the class shall not move on until everyone does show about the same amount and the same quality of learning. Now, with the capacities varying widely, it is impossible to expect that the problem of meeting individual differences has been solved. To reach the standard, some pupils must exert themselves fully, still others will put forth an average amount of effort, and the remainder will coast or loaf. At this point the problem seems clear. The quantity and the quality of the work expected must be regulated so that the achievement of all pupils will be in keeping with their capacities to achieve. The logical starting-point in teaching to regulate the conditions which require pupils to achieve in accordance with their capacities to achieve is the assignment. The assignment has possibilities which will help in meeting the problem of individual differences, if those possibilities are utilized.

The daily assignment.—Regardless of its length, in an assignment there are opportunities to set forth aims which provide for extra effort from those pupils who are able to make the extra effort. By including aims that call for a wider and deeper understanding, an opportunity is provided for those who have the capacity to attain these aims. While all pupils will be held responsible for the attainment of some fundamental aims, there can be aims set forth in addition to the fundamental ones, and it is these additional aims that can demand the attention of those who are able to master the fundamentals as well as the additional aims. The additional aims must not be merely more of the same level of aims; they should be aims that require use of the higher mental processes. There is probably little real benefit that comes if the additional aims do not result in deeper understandings, clearer insights, and wider applications. The idea contained in the preceding sentence needs to be watched carefully. Frequently, teachers think that more of the same thing is all that matters, and as a consequence many assignments contain only more problems to be solved, more pages to be read, more sentences to be constructed, and more boards to be nailed together. It is quite likely that able pupils are only wasting their time doing more of the same thing—the same thing done by less able pupils, but only more of the same thing. The additional aims should demand use

of the higher learning activities. Quality as well as quantity should be the guide in setting forth aims in the advanced part of the assignment.

Suppose, for the purpose of illustration, the assignment on "Air Pressure and Its Uses" is taken to show how the more able pupils may be given an opportunity to do additional work. Evidently the outlet for additional work will take the form of reading, but this reading should be wisely selected. The ideas gained through reading should be pertinent to the subject, but they should be profitable additions. Topics pertaining to the United States Weather Bureau, ways of condensing milk, methods used by aviators in determining altitude, and attitude of ancient peoples and some living persons with respect to new ideas and discoveries will provide opportunities for able class members to use their talent to good advantage.

In some daily assignments there are opportunities to lead pupils into profitable activities in addition to the one of reading. There will be opportunities to work original problems, to make experiments, to gather data for pertinent class reports, to construct graphs, to make demonstrations, or to write essays. The nature of the subject will determine the nature of the activity set for able pupils. Of course, the pupils who do extra work should be given the same degree of attention and supervision as is given pupils who do the regular amount of work. Able pupils desire to have their labors evaluated. More explanation of the evaluation relative to the labors of able pupils will be given under "The Unit Assignment."

The unit assignment.—Enough has been written on unitary learning in chapters vi and x to give the reader a notion of the term "unit." A unit assignment is, then, an assignment that is worked out for a unit. Such an assignment is generally mimeographed or printed so that it can be handed to pupils, thereby giving them at one time a complete plan of the work to be undertaken while the unit is being studied.

During the construction of the unit assignment, it is possible for a teacher to incorporate into the unit exercises that will provide opportunities for able pupils to branch out into divisions of the undertaking which lead to wider and more involved aspects

of study. While the core of the unit assignment will include those fundamental ideas necessary for a good understanding on the part of all the class members, there should be additional exercises intended for those pupils who are able to do more than the requirements included in the core. The core in unit study is often called the minimum requirement; but, whatever the name used, it is that part of the assignment to be mastered by every pupil. Beyond the minimum requirement there is abundant information for more involved study by pupils who have the necessary capacity. In working out the assignment for a unit, one should plan carefully the fundamental ideas to be included in the core, and then he should plan just as carefully the exercises leading to a still greater grasp of the unit. Grasp or understanding of a comprehensive unit is, as a rule, relative. Who understands taxation fully? Who understands the French Revolution 100 per cent? Who has completely mastered "the Critical Period" in American history? There will always be room in the study of most units for pupils to extend their best efforts. Exercises in an assignment which are intended to provide opportunities for special study need to be so thought out that the additional effort results in wider and deeper comprehension. To select these exercises merely for the purpose of keeping pupils busy, regardless of the profit emerging from the extra activity, is not the wise course to follow. The best objectives and the soundest activity should be considered seriously and thoughtfully during the time spent in planning the unit assignment.

At this time clearness can be secured by showing a unit assignment which has the core or minimum essentials and also the additional exercises:

English—The Sketch Book.—The following unit assignment was submitted from the Aspinwall High School, Pittsburgh, Pa. Fifteen points are required for a passing mark; 20 points for a mark of B; and 25 points for a mark of A.

	NUMBER OF POINTS
I. Required of all:	
A. Reading of the following sketches:	
1. Rip Van Winkle	1
2. Legend of Sleepy Hollow	1
3. The Spectre Bridegroom	1
4. The Author's Account of Himself	1

5. The Voyage 1
6. Rural Life in England 1
7. The Country Church 1
8. The Stage Coach 1
9. Christmas Day 1
10. Westminster Abbey 1
11. Stratford-on-Avon 1
12. Biography 1

Subtotal 12

B. Earning passing mark on daily quizzes 1
C. Earning passing mark on test 1
D. Listing the best descriptive, narrative, and characterization pasages 1

Total 15

II. Additional credit for a higher mark may be earned through the following special assignments:
A. Make an outline biography of the author 2
B. Write an essay on the character and personality of Washington Irving 2
C. Write an essay on the charm of travel in America 2
D. Write an essay on Christmas spirit in Pittsburgh 2
E. Write an essay on traveling by motor coach or airplane 2
F. Write an essay comparing rural life in England and America 2
G. Give an oral report on one of the parallel readings listed below 2
H. Write a theme on English dress and customs in Irving's time 2
I. Write a theme on American dress and customs in Knickerbocker's time 2
J. Make a colored drawing of Rip, of the schoolmaster, or of the bridegroom 1
K. Write a character sketch of Dame Van Winkle, Brom, Katrina, or Squire Bracebridge 2
L. Dramatize Rip Van Winkle 6
M. Any other project or problem approved by the teacher. Points to be determined.

III. Parallel readings. (Select one.)
A. Addison, Spectator, Paper No. 1.
B. Franklin, *Autobiography*, "Voyage to England."
C. Dickens, *American Notes*, chapters 1 and 2.

. . . . . .

L. Hughes, *Tom Brown's School Days*, chapter 4.[2]

[2] *Ibid.*, pp. 365–66.

The unit assignment shows clearly the general idea behind it. In the first place, the assignment covers a field of work, a field requiring several weeks' study before it is completed; the field of work should pertain to some central understanding, some era, or some division of the subject that clings together. With the unit itself standing out in relief, the teacher makes out the core or minimum assignment, this part of the assignment being intended to lead up to those ideas and principles and appreciations that should be gained by every member of the class. Beyond the basic aims are other related ideas and principles and appreciations which add more understanding and significance to the unit, and it is these related aims that should be found in the additional exercises. In the unit shown, these exercises for the more able pupils are themes, character sketches, dramatizations, oral reports, biographies, readings, or other suitable projects and problems.

Differentiated assignments.—In the reading of educational literature, one might conclude that a different terminology automatically signifies something new. The term "differentiated assignments," for our purpose, carries no significant meaning or connotation not already implied. Differentiated means only that the assignment has been blocked off into divisions, thereby making it possible for members of a class to progress from the lowest division upward into or through divisions of a higher order. The first division is generally called the minimum requirement, that is, the part of the assignment to be covered by all pupils. The next higher division is frequently called the average requirement; it is that part of the assignment which can be started or completed by those pupils who can do more than the minimum. The highest division is that part designed for the very best pupils —pupils who are able to do more than the work required in the minimum and the average divisions of the assignment. The assignment in "English—*The Sketch Book,*" is to all purposes and intentions a differentiated one because it contains parts which might be called minimum, average, and maximum.

Judgment to be exercised in planning assignments.—The best judgment a teacher possesses should be exercised in devising

assignments that are to satisfy the capacities of pupils. These assignments are not figured out according to rule; they are and should be constructed in accordance with fundamental principles of learning. Too often not enough thought is given to this part of a teacher's planning. At other times these graduated parts of an assignment are worked out mechanically, resulting in only more of the same thing, not in a basic variation in objectives or in the processes involved in attaining them. Probably the common fault permeating the construction of the graduated parts in assignments designed to care for individual progress is that fault of including just facts, bare facts, and still more facts in the minimum requirement. Too often the minimum requirement demands the memorization of materials—materials devoid of any activity except that of reading from a textbook. This should not be. Of course, such planning is easy, but it is not wise. If the basic ideas that should be included in the minimum requirement demand demonstration, experimentation, problem-solving, sensory-experience learning, emotional learning, or manipulation, then all these should be found in the learning of pupils who can complete only the minimum. It is not good sense to demand that the least able of the pupils should devote their study to the bare and uninteresting and abstract phases; rather should the most able pupils labor with the abstract and theoretical aspects. From the standpoint of learning it can be seen that requiring pupils of least ability to deal exclusively with the memorization of abstract materials will result in monotony, drudgery, meaningless absorption, and ineffective learning. Every principle already stressed in this book relative to objectives, self-activity, types of learning, unity and motivation should be kept in mind by anyone who plans assignments to care for pupils of varying capacities. When the planner fails to base his planning upon sound principles, his assignments cannot be sound and fundamental.

Contents of unit assignments.—In individual instruction the assignments are developed in great detail, while in daily assignments much of the contents may be given through oral means. There is no generalization which should hold in all cases because the equipment, the textbooks available, the library, the ability

of pupils, the facilities for mimeographing, and other conditions are not the same in all schools. When conditions permit, it is wise to make assignments that throw as much responsibility upon pupils as can be done, for, by so doing, the pupils rely less and less upon oral directions from the teacher and depend more upon the contents of the assignment for their directions. Aims will, of course, be set forth so clearly and vividly that there is an exact notion of the degree of achievement expected. But beyond the aims and the references, there should be enough direction so that pupils will study effectively. Some unit assignments include study directions, the experiments to be performed, together with helpful suggestions, original problems to be solved, maps to be drawn, degrees of achievement desired, thought questions, and other suggestions and exercises. The more help a teacher gives in the assignment, the less confusion there will be in the pupils' minds. Considerable time and effort need to be spent before a directive assignment emerges.

Teaching mixed groups.—The procedures followed in teaching to provide for the individual progress of pupils must necessarily be such that the progress of each pupil is promoted. What can and should a teacher do to bring about most profitable learning from each pupil in an unselected group? The following activities of the teacher who teaches a mixed group will give a general understanding of her major responsibilities:

1. A great deal of individual attention should be given to pupils. Not all class time, or even a large part of it, should be given to the hearing of recitations. There must be a shift from any procedure which has for its purpose the assignment of pages and the testing to see how much the pupils have memorized. The triumvirate of assign, test by a constant barrage of questions, and give many examinations to obtain grades must be thrown into the discard.

2. Much of a teacher's time will be devoted to her advisory activities. She will give pupils advice, start them on new projects or problems, and keep their learning moving forward.

3. Pupils will be encouraged and taught to study independently. Materials of instruction will be procured and placed in the classroom. The aims and the ways to attain these aims will be kept before pupils. The classroom will become a place for learning, a laboratory, and not a place to reiterate memorized materials already known by the pupils.

4. Conferences will be in order. Pupils will bring their problems to the teacher; the teacher will guide and direct pupils; the work will be individual in nature; and the teacher will become a helper, not merely a dreaded inquisitor.

5. The teacher will study each pupil; she will diagnose his weaknesses, discover his real capacity, give him individual and pointed advice, urge him to do his very best.

6. At times the whole group will be called into session to consider ideas and principles of value to everyone.

7. At times the whole group will be shown a demonstration, or an experiment of vital concern to every pupil will be performed, or the dramatization of some important event will be staged in order to add appreciation or understanding.

8. If some pupil, through experience or investigation, has found information which will be of value, he will be called upon to make an oral report before the group. Technical projects or problems will not take the form of reports, because the group cannot be expected to profit from reports of a technical nature. The teacher will evaluate such information in an individual conference.

9. Much time will be devoted to the evaluation and examination of individual projects, problems, themes, etc. There will be more evaluation and correction of pupils' work, but the teacher's energy will be directed to individual productions and not so much to the correction of examination papers.

10. In class time, and out of class time, the teacher will center her efforts upon individual as well as group progress. Her work will be more intensive and extensive, but the progress of each pupil will be her constant concern.

Teaching to provide for the individual progress of pupils in a mixed or unselected group is not easy; it is difficult, but it is interesting and profitable. The author would advise young teachers to begin cautiously and carefully when undertaking to provide for individual progress of pupils in mixed groups. It would be advisable to become accustomed to the group, to learn the capacities of the pupils, and to become familiar with their habits of study. A teacher will want to know her own ability in doing the work required of her. A careful introduction of the pupils to some of the elementary phases of the procedure would be desirable at first; and then, after the pupils learn to adjust themselves to the new learning situations and the teacher becomes more confident of her ability, more involved parts of the procedure can be introduced gradually until the class work is carried forth by the means and ways stressed in this discussion of teaching mixed groups. The teacher and the pupils must live

and learn just as do other workers when conditions and procedures are altered. To proceed gradually and surely is better than to leap forward without knowing the way.

SECTION 2. TEACHING PUPILS GROUPED ACCORDING TO ABILITY

From the standpoint of teaching, it will not be necessary to discuss here the methods and criteria employed in grouping pupils according to ability. This problem is the work of the administrator. Attention, in this discussion, will be given to the characteristics of pupils who have much ability, those who have average amounts of ability, and those who have meager mental endowments. The teaching of these groups is, of course, the paramount consideration.

Are the pupils in a bright group equally bright? Are the pupils in a dull group equally dull? Are pupils in average groups exactly average? What should be the nature of teaching when one is in charge of a bright group? How can one teach pupils with meager endowments? How will the teaching of average groups differ from the teaching of bright or dull groups? Is there some technique which will bring success if one but know and use the technique? These questions are asked, not to bewilder the reader, but to draw his attention to the composition of, and the teaching connected with, groups that are described as high, average, or low in capacity to learn.

An analysis of ability groups.—Suppose that one hundred Freshmen enter a certain high school. These pupils come from different homes, different stock, and different sections of the community; some of the pupils are healthy, some are in ill-health; some have had opportunities to develop, others have been under handicaps. The hundred pupils are divided into three groups: the high, the average, and the low. An accurate analysis would reveal the fact that all pupils in the high group do not have equal capacity and that pupils in either one of the other groups do not have equal capacity. In reality the range of variation has been reduced, but there can never be a group in which every pupil has the same amount and kind of talent as has every other mem-

ber in the group. Ability grouping, then, reduces the range of variation, but the members in a group can never be equally endowed with the same capacities to learn. An important step has been taken, however, if the range has been reduced from wide to narrower limits. The larger the number of pupils involved in grouping, the narrower the range can be made. If the number of pupils involved is too small, then grouping by ability is not practical. Under the assumption, now, that one is a teacher, how and what shall he teach if the pupils in his classes are grouped according to ability?

A low-ability group.—You are visiting a low-ability group in the seventh grade of a junior high school; the principal has advised you to observe this class because it is the lowest section. At the beginning of the period the teacher gives this direction: "Tell exactly what happens to foods from the time they enter the body until they are absorbed and assimilated by the cells of the body." Pupils sit at their seats. They are to read a chapter in a physiology book that gives the needed information. An examination of the textbook reveals that the chapter to be studied is difficult; there are formidable words, such as "enzyme," "assimilation," "carbohydrate," and "peristalsis." Some of the material would make college Freshmen gasp. At her desk sits the teacher; during the whole period she remains there. Bare walls incase the learners; one can see nothing more than the desk, the seats, the physiology books, the teacher, and the pupils. The pupils are well behaved; they do not smile, they seem solemn and glum. Occasionally, a pupil looks at you, but as soon as you get his eye, he winces and lowers his head. Some of the girls are quite attractive in appearance, but there is a dulness in their eyes, a blankness in their expressions. You wait for something to happen, but nothing does. Study continues during the whole period; the pupils are to get the information needed to understand what happens to the foods. On the next day you visit again to see what will occur. You hear the teacher drawl out this command: "Put your books aside and write out a complete answer to the problem I gave you yesterday: What happens to the foods from the time they enter the body until they are absorbed and assimilated by the cells of the

body?" What a dismal showing the pupils make! Many papers, even at the end of the period, contain only a few short sentences. On the third day you visit again. The teacher says, "Your work yesterday was a complete failure; take your books and read that chapter again." So the pupils settle down and remain solemn and oxlike for another hour.

Did this teacher hit the mark in her teaching of these meagerly endowed pupils? She missed lamentably: (1) in the what to teach and (2) in the how to direct learning. What is there to be learned with reference to these two responsibilities in teaching low groups?

1. *The what to teach.*—There need be no extended treatment of the aims. The aims were beyond the learners. The information in the physiology book was technical, abstract, and extremely complicated. These pupils were not studying to become surgeons or highly skilled physicians; their aims should have been those related to everyday living. About all the school can do for these pupils is to inculcate some habits of healthful living, some appreciation of and concern for the human body, and some simple understandings of the influence of foods upon one's health and happiness. Instead of expecting these pupils to know the technical names for the ingredients of foods, the teacher should have stressed the eating of more fruit and vegetables; instead of trying to have them learn the enzyme in saliva, she should have stressed the thorough chewing of foods; rather than expecting the memorization of the technical names for the layers of the stomach, she should have brought out the causes for pains in the stomach; in place of demanding that pupils explain scientifically how the food passes from the intestines into the blood stream, she should have generated some concern for the proper elimination of waste materials from the large intestines.

2. *Directing the learning.*—If pupils are found to be slow and somewhat shallow in their learning, there must be causes for the slowness and shallowness. Surely the causes must be a lack in those powers which produce rapidity and depth in learning; in other words, the powers of ready insight, abstract reasoning, quick recognition, vivid imagination, strong retention, keenness

in association, and analytical adeptness are poorly developed. Under these circumstances, the instruction must employ, and call into action, those mental powers that the slow-learning pupils do possess.

1. Slow pupils can learn by every one of the types of learning, but the extent to which they can use these types is limited.

2. In low sections sensory-experience learning should be relied upon heavily. Backgrounds should be built up so that words connect with realities. Specimens, graphs, charts, objects, and other visual materials should be used constantly. Vocabulary lacks are prevalent among these pupils. The teaching should be concrete.

3. Retention is weak. Repetition will be necessary to instil many of the habits, skills, and ideas. Meanings, however, should not be neglected, but the meanings should be in keeping with the capacity of these pupils to grasp meanings.

4. The powers of attending are limited. The teaching should be motivated. Long and intensive application cannot be expected; there should be variation in the work. Much physical activity should be woven into the classroom learning, because abstract book learning soon becomes monotonous to these pupils.

5. Interests and appreciations need to be among the aims emphasized. Too often members of low groups are considered routine workers, and, as a result, only the mechanical and factual materials are taught. Among the minimum essentials should also be those aims which touch the emotional side of these youngsters. The dramatic, the adventurous, and the action aspects of subjects should be stressed. The interesting and "meat" phases of history, science, health, and other subjects are not to be extracted from these subjects just because the pupils are in a low section.

6. Patience, kindness, tolerance, and enthusiasm are among the many traits a teacher of low groups should possess and display. Life and learning for pupils in low groups are not easy, and the instructor should always keep in mind that his duty is to lead and not drive. The nature of the pupils and the nature of the teaching should be harmoniously adjusted to each other.

Characteristics of pupils in high-ability groups.—If pupils are placed in high-ability groups, there are reasons why they are placed in these groups. Pupils in these groups do not have powers different from the powers of pupils in low groups; they have the same kinds of powers, but the powers, for the most part, are stronger, deeper, and more highly developed. Bright pupils will be found curious and inquisitive; they will ask many and difficult questions; they will want to know the why's of happenings and

events. These pupils are quick in their thinking, in their associating, and in their analyzing. Their learning is rapid, and their retention is strong. Their interests are numerous; their contacts, many; and their experiences, varied. Bright pupils are keen observers; they profit from experience; they see relationships. They give careful attention, and they give it constantly. They can think abstractly, and they can make generalizations readily. In short, these pupils have the necessary amount of power in their mental makeup to enable them to learn rapidly and fundamentally. Bright pupils are immensely active and extremely interesting.

Teaching high-ability groups.—Characteristics of pupils in high-ability groups should be guides in determining what kind of teaching should be done. The following activities are indicative of the character of instruction needed to meet the powers of pupils with much ability.

1. Aims selected should be increased in quantity and quality as compared with the aims selected for lower-ability groups. There should be more associations and more involved ones, more and wider applications, and more and deeper understandings.

2. The energies of bright pupils should be directed, and much of a teacher's time will be spent, not in giving minute directions, but in directing energies into profitable channels.

3. These pupils can study independently, and they should be directed so that they do. The teacher's work will consist of planning exercises and setting situations in order that pupils may go forward independently and progressively.

4. Problem-solving will be the type of learning most in keeping with the characteristics of able pupils. Curiosity and inquisitiveness and capacity to reason bring out a condition in class which makes solving of problems an enjoyable enterprise.

5. These pupils have good memories. Drilling and instilling of facts and figures and rules will not be a major concern of the teacher.

6. Abstract parts of subjects can be taught without the meticulous building-up of backgrounds by visual aids and numerous illustrations; pupils will use their imaginations correctly and appropriately; they will visualize, they will see points quickly, and they will make rich associations.

7. The instructor must be well prepared because his learners delve into every phase of a topic. He must also be quick in his thinking and in his responding.

8. Every outlet that the energy of bright pupils takes should be developed, that is, the reading and study habits, the library habit, the organiza-

tion of materials, the reasoning, and the other processes and methods should be watched. Because these processes and methods function quite well without training is no reason why they should be taken for natural abilities. The processes should be developed simultaneously with the subject matter taught.

Teaching average-ability groups.—A few words will suffice in discussing the characteristics of pupils in average-ability groups because the preceding treatment of low and high groups should indirectly give the reader a good notion of the characteristic nature of average-ability sections. Neither should there be any urge for an extended discussion of the teaching in average-ability groups. With the extremes of capacities as starting-points, one can work in toward the middle; he can arrive at a workable understanding of the learning characteristics and the ideas relative to teaching of average-ability groups by averaging the extremes as found in the discussions of high and low groups.

Of course, the purpose of this whole discussion of high, average, and low groups is to give more of an approximation than a true and accurate representation of the groups. An average group in one school is not exactly the same as an average group in another school. The highest group in one school may not have the same capacities as the highest group in a different school. No person can know the true conditions in any group until he has studied the pupils; the ideas and generalizations presented here, with reference to the different groups, are guides and not laws. These ideas and generalizations will give the general trends that should be considered while dealing with pupils in different groups, but careful study of the groups while actually teaching them is needed to give the specific information that should be known by the instructor.

Ability grouping not wholly sufficient.—Grouping does not guarantee that all pupils in a certain group are equal in capacity to learn; it only insures that the variation in the group has been narrowed. There are individuals who are good in one subject and relatively poor in another; some individuals have special capacities and abilities that others do not possess or do not possess to the same degree. Pupils with good minds may be hindered in their learning by physical weaknesses. Grouping cannot iron

out the differences completely. It seems quite obvious, therefore, that many of the ideas brought out in the teaching of mixed or unselected classes must be used in working with pupils grouped according to ability. Conferences, assignments, diagnoses, special projects and problems, and other purely individual means can and should be employed to help administer to the needs of every pupil.

At the same time, it can be seen that many of the ideas gained in the discussion of teaching pupils grouped according to ability can be applied to the teaching of mixed classes. A study of the characteristics of bright and of dull pupils should help a teacher immensely in dealing with these pupils regardless of when or where these pupils are taught. A teacher should always study her pupils when she endeavors to improve instruction.

SECTION 3. PROJECTS AS MEANS TO PROVIDE FOR INDIVIDUAL PROGRESS

Meaning of the term "project."—In developing the meaning of "project," many of the ideas and principles of learning stressed heretofore will, undoubtedly, appear again; but this will only show that fundamental ideas are always present when any procedure worthy of consideration is discussed.

Rather than starting immediately with the definition of a project, the author will try to set a learning exercise so that the reader, after he gains a number of ideas, can generate out of his supply of ideas a definition that will meet the requirements. Read now, if you are not able to recall, the story of the boy learning to ride a bicycle (chap. vii). Was the learning in this case worth while to the boy? It seems that the ability to ride is important because one who has this ability can enjoy himself, secure valuable exercise, move from place to place more rapidly, and gain in an economic sense, for example, by selling more papers or delivering more messages. Turn now to the attitude of the boy. Did he himself desire to acquire this ability, or did someone else decide for him? Surely, the boy decided that for himself; it was his desire to learn to ride. Did the learning progress under artificial or natural conditions, that is, was the learning in the

realm of the make-believe, the artificial, the compulsory, or was it carried out under free and natural conditions? Was it true to life? Well, the learning was brought right down to earth (two meanings possible); the boy learned to ride just as other persons did; there was nothing of the artificial about it. Did the boy finish his job? What kept him at his undertaking until it was completed? Every suggestion he received seemed to be intended to stop his activity; for example, his mother's request that he stop and come in for his evening meal. The reader may be aided in formulating a definition of a project if he contrasts the learning to ride with learning to solve algebra problems in school—a school in which learning to solve algebra problems is distasteful.

An analysis of the complete learning-to-ride situation reveals a few characteristics of the learner and the learning that make this particular acquisition of an ability different from the acquisition of so many abilities sought for and taught in school. What are these characteristics of the learner and the learning in the bicycle incident? (1) The boy desired to learn to ride; (2) he considered the ability immensely worth while; (3) the ability was not easy to acquire, but the boy persevered until he acquired it; (4) the learning was true to life, the real thing; (5) the boy could see his degree of progress, his sucess was tangible; and (6) the motivation came from within; it was not forced by outside influences. Learning to ride a bicycle, from the boy's standpoint, was a real project. Now, why can this learning be called learning by means of a project? In other words, what is a project? What is your definition? If you cannot formulate a definition, can you describe the conditions in the learner and in the learning which you think must be present in a genuine project. Ideas are of more value than a definition; ideas can be applied, definitions are often merely memorized words never applied. *When a pupil considers an aim so vital and worth while for him that he is willing to work under his own power and under free and natural conditions to attain that aim,* his undertaking can be truly called a project.

Real projects and pseudo-projects.—Very often so-called "project-teaching" is nothing more than the name, and naming never makes a flower smell more sweet. The essence of learning

by projects is found within the learner, not in the kind of external activity set into motion or in the form of the result. Here is a pupil who is told that he must make a cedar chest, or that he will be required to plant and raise a patch of corn, or that he is assigned the job of constructing a pig trough. Ask the teacher about the teaching, and he will say that the pupil is working on a project. True, the tasks are objective, and the results take concrete or material forms; but the pupil has no choice; the work is assigned and it must be done. A teacher of history assigns a chapter, and a pupil does the work because that chapter is a part of the history course. Is not study of the chapter of history as truly a project as the making of a cedar chest? Do the mere facts that one pupil reads and thinks and organizes while the other saws and planes and nails make the difference? Is not reading as true to life as nailing? Are not the facts and generalizations and appreciations from history as worth while as the cedar chest? Why, then, should the history teaching be considered just the traditional method while the cedar chest work is delightfully called the project method? The truth of the matter is that, if the making of the cedar chest is a project, then the reading of the chapter of history is a project also. Probably neither one is a real project; probably both are merely old-fashioned assignments. The characteristics of the learner and the learning found in the real project of learning to ride a bicycle seem to be missing completely in the history and the cedar-chest undertakings.

A project in French.—In relating to her pupils what she had seen while visiting a neighboring school, a teacher of beginning French mentioned that the pupils in a certain class staged a banquet at which every word spoken was spoken in French. At the banquet no pupil was passed foods unless he asked for them in French. Each pupil was polite, engaged others in conversation, thanked the waitresses, asked for another cup of coffee, etc. Every word spoken was in French. There was a wide variety of foods and beverages. The banquet was held in the home economics dining-room. After relating the experiences she had had in the neighboring school, the teacher went on with the usual class activities. The next morning a few of the pupils asked the teacher

if it would be possible for their class to have a banquet at which only French would be spoken. "Indeed," said the teacher, "I would be more than pleased; but isn't this a problem for the whole class to decide?" Without any further urging from the teacher, this problem was talked up by the pupils themselves until there was a unanimous feeling that a banquet must be given. The teacher consented and entered into the spirit of the enterprise. So there followed the listing of those articles of food that would be offered and the beverages that would be available. "How shall we say: Will you please pass the cream? Excuse me, please? No, thank you, I have had plenty. What is the French word for *olives?*" etc. Pupils practiced among themselves, before school, after school, and on their way to and from school. Every pupil was busy with the food vocabulary. The class time was devoted occasionally to the learning of ways to express this idea or that statement. Finally the banquet was given; it was a genuine undertaking and a complete success.

Attitude of learner essential.—Although a group project, the banquet-learning is similar to the individual project-learning as illustrated in the case of the boy riding a bicycle. In the final analysis the attitude of the learner is basic, and, unless a pupil enters into the undertaking with a self-initiated determination, his attitude becomes similar to the common and listless feeling of pupils in meeting school requirements. Project-teaching, after all, is just another way to teach—a way that might secure from pupils a better attitude, a kindlier feeling, a greater expenditure of effort, all for the purpose of securing more efficient learning. Of course, it is not to be expected that project-teaching can automatically insure the right attitude, feeling, and effort; but these conditions should be striven for at all times, otherwise project-teaching degenerates into the assigning of tasks, the recording of grades, and the giving of marks. If projects become pure devices, routine apportionings of work, jobs set by the teacher, then the vibrant and invigorating possibilities in this way of directing learning are bled to pale and skeletal whiteness. And what shall it profit classroom learning by having a real possibility, now reduced to a skeletal device, brought into the learn-

ing environment? Can a device, just because it has a new or different name, usher into classroom learning the attitudes, interests, desires, types of learning, and sound activities that produce maximum achievement?

Keeping the project vibrant and invigorating.—In using projects to promote learning, the following conditions should be fulfilled to the highest degree possible.

1. During the initiation of projects arouse the desire of the pupil or pupils. The mind-set, the interest, the inclination, and the determination generated by the pupil give him a favorable outlook toward the undertaking; this outlook is necessary because it brings into play the power that might otherwise lie dormant and inactive. If a pupil considers an aim so vital and worth while that he takes the initiative himself, an ideal condition exists; but, if an ideal condition does not exist, then the initiation can be stimulated by another person. One need not wait for spontaneous pupil initiation; if he can arouse a pupil to determine to carry through a worth-while undertaking, he has fulfilled a significant teaching responsibility.

2. Set the stage so that pupils select projects which are vital and worth while. Real leadership is needed at this point. So often pupils cannot or do not realize what opportunities lie near at hand. The project in French, cited a few pages back, illustrates how an opportunity was suggested to pupils and how the pupils put their whole effort behind the undertaking. In dealing with an individual pupil, the same suggestive method can be employed. Give pupils something to think about, expose them to possible lines of action, and lead them to see profitable endeavors.

3. After a pupil has started to work on his project, allow him to proceed under free and natural conditions. His planning, his originality, his artistic ability, and his ideas and notions should be given full exercise. If he seeks advice, give it; if he does not seek, offer suggestions and possible ways of procedure, but do not dictate. Be a helper, not a fault-finder inspector.

4. Projects included in the average or maximum parts of the assignment should be carefully selected; they should lead to

deeper and more involved phases of the unit under study. Quite often the exercises or projects intended to provide for the more able pupils are trivial and unprofitable; these extra requirements should, on the contrary, be so selected that pupils, after completing them, have grown to an extent commensurate with their capacities and abilities.

Projects in different subjects.—Projects were first introduced in such subjects as agriculture, industrial arts, and home economics. These subjects, by their very nature, can be blocked off into individual or group undertakings. In fact, it would be difficult to teach these subjects, especially industrial arts and certain phases of home economics, without having pupils make individual articles, construct certain pieces of equipment or furniture, or do certain jobs requiring completion of concrete and single constructions. But whether the characteristics that enter into a true project are always present in the above-named projects is questionable. The projects may be only assigned amounts of work to be done and, in reality, are not projects in the genuine sense unless the only characteristic of a project believed necessary is concreteness. It may be, however, that the so-called "projects" by their very concreteness generate in the learner and in the learning many of the characteristics of real project activity; and, if this be true, then these projects become genuine. A pupil may, by the work required of him, become so enraptured as he continues that the characteristics necessary in a project are brought into his assigned job.

Who is able to say when project-teaching begins and when it ends? Is one teacher justified in calling her teaching project-teaching because her pupils make dresses while another teacher must say that she is using the question-and-answer method just because her pupils learn by means of printed and spoken words? Let us go back and examine the learning that is genuine project-learning: When a pupil considers an aim so vital and worth while for him that he is willing to work under his own power and under free and natural conditions to attain that aim, his undertaking can be truly called a project. A group of pupils in science, after hearing a good assignment, feel interested and concerned; they

study willingly and freely, they gain the understanding, and they complete the unit. Does not this learning fulfil the conditions found in genuine project-learning? Are not the attitudes of the learners just and proper? Are not all the conditions right? Why, then, cannot this undertaking be called a project? Must there be a dress, a cedar chest, a patch of corn, or something in tangible and material form before the work can be called a project?

The reader should be most concerned with the characteristics of the learner and the learning that are dominant in genuine projects. He should make every effort to see these characteristics, such as the worth-whileness of the undertaking, the desire of the pupil to proceed under his own powers, the free and natural conditions under which the pupil works; in short, the forces that operate to promote better learning should be analyzed out of the activity. Every one of these forces should be stimulated and brought to bear upon learning, regardless of the subject taught and regardless of the name given to the procedure used. It is the better stimulation and promotion of growth that improve instruction; if the project method is suitable and practical, use it; if it is not, then incorporate the ideas gained from the study of the project into any method or procedure which you do employ. There should be constant effort made to bring into the learning situation those forces and factors that produce abundant expenditure of energy. One need not be influenced by nomenclature; he should be thinking of the effectiveness of his teaching in bringing about what he considers the proper development of his pupils.

SECTION 4. PROVIDING FOR DIFFERENCES THROUGH INDIVIDUAL INSTRUCTION

All good teaching makes it possible for individuals to learn independently of others; but teaching which aims particularly to provide conditions so that pupils can progress at their own rate by following a definite set of activities leading to specified standards is characterized as individual instruction. As carried out in a few school systems, most notably in Winnetka, Illinois, a pupil

advances through the exercises at his own rate and then passes to the next grade at any time that the standards of achievement in a subject for his grade have been satisfactorily met; the essence of the plan is acceleration, and acceleration is by subjects. In Winnetka the plan has been worked out for the elementary and junior high school grades.

As secondary education is now carried forth in this country, it is quite unlikely that a teacher will ever find herself in a position where it is possible to teach out every phase embodied in pure individual instruction, but the ideas about individual work as profitable activity, as sound psychology, can be utilized by any teacher to influence instruction and promote learning.

A principle of teaching is to secure not only activity but also psychologically sound activity in learning. Individual instruction has for its main purpose the maximum development of each individual according to his capacities. All real endeavors to meet individual differences have the same basic purpose. In school situations wherein acceleration is not practiced, development must be thought of in terms of broader growth in the same division or unit of learning; hence, the instruction of individuals becomes individual instruction wherever attempts are devised to make it possible for pupils to grow through their own efforts, regardless of whether the development means covering the same materials faster or securing deeper meanings of the same division or unit. In either case, it is the securing of maximum progress through individual effort that characterizes individual instruction as well as any other kind of instruction worthy of recognition. Securing the maximum of individual growth through psychologically sound self-activity is a principle of teaching everywhere regardless of the plan or method of teaching.

Two phases of individual instruction.—The pupil who learns under individual instruction (1) does his work with a maximum of self-help and (2) progresses as far as he can during a certain time. To bring about realization of the first phase, the pupil is furnished with exercises so specific in construction and purpose that he can, by reading instructions, advance without very much or any group instruction. In short, he has the instructions and

prepared materials in mimeographed or printed form and he works individually. Realization of the second phase (when acceleration is not practiced) is made possible by providing opportunities for the pupil to progress to his maximum limit while he works individually; giving additional exercises, projects, and problems is a means to care for individual capacity.

An illustration of prepared exercises which give opportunity for individual study to operate is furnished by exercises planned for a junior high school English class:

NOUNS

What qualities do all the words in Column I possess? In Column II?

I	II
boy	run
chair	talk
children	swim
people	strike

Write ten words like the words in the first list.

The words in Column I are names of people or things. The words in Column II tell what people do. Write the name of the class of words which are in the first column ——. Yes, they are nouns. The ten words which you listed should all be nouns. Write a sentence telling what you think a noun is.

I	II	III	IV
preacher	town	brook	quiet
teacher	country	bridge	beauty
girl	school	magazine	peace
boy	street	pencil	friendship

What does each noun in Column I name? Write the word which tells this ——.

Write the word which tells what the nouns in Column II name ——.

Write the word which tells what the nouns in Column III name ——.

Write the word which tells what the nouns in Column IV name ——.

The nouns in the first column name persons; in the second, places; in the third, things; and in the fourth, ideas and qualities.

Write ten nouns of each kind from some chapter in your geography or history book.

How are the nouns in Column I different from the nouns in Column II? How do they look different? Do they have different meanings?

I	II
Fourth Street	street
America	country
Mr. Lindsay	teacher

Write down in one or two sentences the difference you find in these two groups of words.

Find the names of the class of nouns in the first list and then in the second list from your text and write them on the lines.

——— ———

The nouns in the first list are usually called proper nouns, and those in the second list are usually called common nouns.

Discover the difference in the way common and proper nouns are written. Write a rule that will clearly state this difference.

PROBLEMS:

I. From your geography book select the names of ten things.
II. From your history book select the names of ten persons.
III. Write the names of ten places which you have recently studied in geography.
IV. From your history book or reader select the names of ten ideas or qualities.

I	II
boy	crowd
girl	flock
teacher	group

How do the nouns in the first column differ in meaning from the nouns in the second column? How many persons make up a crowd? How many birds make up a flock? Find the name of nouns like these in Column II. Write it. ——.

Write ten more collective nouns. Use five of them in sentences.

Opposite each common noun write a proper noun belonging to the same class. Example: town—Jeannette dog—Fido

1. month	6. inventor
2. automobile	7. county
3. soldier	8. sea
4. ocean	9. explorer
5. ship	10. aviator

Write a proper noun belonging to each class of common nouns. Use the common noun as part of the proper noun. Example: park—Oakford Park

1. river	6. college
2. city	7. school
3. street	8. valley
4. bank	9. ocean
5. store	10. railroad

Select all the proper nouns from one page in your geography book.
Select all the common nouns from one page in your history book.

STUDY TEST

I. A word which is the name of a person, place, thing, or idea is a ——.
II. A word which is used as the name of any one of a class of persons, places, things, or ideas is called a ——.

III. A word which is used as the particular name of a person, place, thing, or idea is called a ——.

IV. A word which is used as the name of a group or collection of persons or things is called a ——.

V. A word which is used as the name of an idea or quality is called an ——.

VI. Put one line under each common noun and two under each proper noun.

1. Ohio was settled by a group of brave pioneers.
2. Real bravery was found in the heart of many a soldier.
3. Gold and silver are precious metals.
4. George Cable wrote interesting stories of New Orleans.
5. Uncle Tom was the main character in a well-known book.

VII. Make lists of all the nouns in the foregoing sentences according to the following classes: Naming persons, places, things, ideas.

The exercises planned for nouns show how a pupil can follow the directions and finally gain that knowledge of nouns deemed necessary by the teacher. Sometimes self-corrective practice tests are also constructed so that the pupils can correct their own work, thus relieving the teacher of too much checking. However, final or mastery tests will probably be administered and corrected by the teacher.

Thus far the illustration has only shown the nature of exercises planned so that pupils can study individually, and, if acceleration is not practiced, then additional work must be provided for able pupils. Additional opportunities either will be more exercises of deeper significance along the same self-help and self-corrective lines or there will be suggested projects and problems which might be similar in nature to those found in unit assignments.

Evaluation of individual instruction.—Although it is quite logical to conclude that individual instruction as a plan does provide for self-instruction, it must not be assumed that the tenets of the plan cannot be carried out in other kinds of instruction. Probably the greatest contribution inherent in the plan is the idea of planning exercises so that pupils can, by following directions, work at their own rate until certain prescribed standards have been reached. The plan does require the careful selection of objectives and the devising of learning exercises which lead to the objectives. However, it may be that the objectives or standards result in just average achievement or in some level of

achievement for everyone, and it may be that the exercises are so detailed and minutely worked out that pupils are deprived of much worthwhile mental effort in the way of planning, thinking, organizing, and judging for themselves. If an aim of secondary education is to develop the ability to study independently, then it stands to reason that the ability must include more than merely following through what somebody else has devised. Independent study must include the ability to discriminate, to evaluate, to organize, to consult sources of information, to weigh the evidence, to verify, and to come to some solid conclusions. It is entirely likely that too much assistance will defeat the purpose of making pupils self-reliant and efficient independent workers. The whole problem again resolves itself into the interpretation placed upon individual instruction. If the objectives are planned for individual differences and if the exercises do provide for the maximum of thinking and originality commensurate with capacities, then the plan becomes a means of instruction, and instruction does not become thwarted or restricted by the plan.

SUMMARY

No other topic in teaching has received more attention within recent years than the problem of providing for individual differences. In fact, practically every plan seems to have had its origin in that thinking which led to a better solution of the problem.

An examination of any one of the provisions reveals the ideas that the originator has about directing educational growth. But the ideas in turn bear directly upon the fundamentals entering good teaching anywhere and everywhere. There are ideas about aims, self-activity, types of learning, unitary learning, motivation, and diagnostic and remedial instruction. It is quite evident that the types of learning, the forces and urges supporting effort, the activities of a sound psychological nature, and the nature of pupils do not vary to any great extent; all these remain quite constant in spite of plans, and any plan that really influences these factors most advantageously and profitably is a good procedure regardless of its name. In the study of plans, attention should be focused upon the ideas that can be secured from the

originator of the procedure. One is not bound by any law to accept the whole plan or even a part of it. Judgment should be the guide. Seek and accept that which is good.

Billett's inquiry shows that teachers are searching for the fundamental ideas and principles underlying learning and that teachers are employing these ideas and principles in the classroom regardless of the names given to their procedures. Three hundred and sixty-two schools were arranged into seven groups according to the plan which characterized the teaching procedures used in the schools. The seven plans or procedures employed in the seven groups comprising the 362 schools were: long-unit assignment, individual instruction, contract plan, laboratory plan, problem method, project method, and a combination of one of the preceding with differentiated assignments. These procedures, as stated in the monograph, were all characterized by the unit assignment. Two excerpts from the monograph follow:

> In this section three lines of evidence will be presented showing that methods of organization, administration, and classroom procedures are essentially alike in all seven groups of schools selected for intensive study regardless of the name preferred for the practices reported. . . . .
>
> From a common-sense standpoint the conclusion is justified that these groups of schools reporting different names for their procedures are doing the same things in the same ways. Practices typical of one group are typical of all. Practices tabooed in one group are tabooed in all.[3]

The plans described, and the others not described, are not departures from fundamental principles of learning and teaching. They cannot be. If they were, they would not be considered by persons who do understand instruction. The plans, after all, are merely ways to bring about better learning. It is quite natural for one, as he understands better the principles of teaching, to deviate from his former practices; and that is exactly how the various plans originated. It must be remembered, too, that many plans are used by teachers who have not had their procedures patented, so to speak. And then there are so many ways or procedures that have become so common that they are not named at

[3] *Ibid.*, pp. 321 and 328.

all; they are just called, for example, the developmental, the common problem-solving, and the appreciation methods. There are no routines which automatically fulfil the principles of teaching, particularly the principle of providing for individual differences. Keen discrimination and sound judgment will always find a place in planning and carrying out instruction.

Every secondary-school teacher is confronted with the necessity of providing for the individual progress of her pupils. While some instructors pass over this responsibility unconcernedly, others will be concerned and will plan procedures which promote the progress of each individual. The task is not an easy one; it requires much effort and foresight. Those provisions explained and illustrated in this chapter constitute only a few of the many provisions found in secondary schools. Because instruction is carried forth under different conditions, each instructor must plan a program which will meet her particular class needs and circumstances most advantageously.

APPLICATION EXERCISES

1. Did you ever learn something worth while because you really wanted to learn it? On the contrary, did you learn because a task was assigned as required work? Explain why you learned more willingly in one case than you did in the other.
2. In chapter vii there is the story of John and his learning to ride a bicycle. Is there anything about educational psychology in that story which might help you to understand the forces behind a real project? Could these psychological forces be utilized in any kind of teaching procedure or are they limited to the project?
3. Examine the units on "The Critical Period" and "Community Life Problems" in chapter x. What means were used or could be used in these units to provide for individual differences?
4. One teacher has five small classes during the day, and another teacher has five very large classes. In which classes could one do a better job in providing for differences? Would the means used to provide for differences be the same in both cases if the two teachers did provide for differences to a large degree?
5. Do you believe that bright pupils can use the problem-solving type of learning better than the memory type? Can slow-learning pupils use the problem-solving type or must they employ the memory and sensory types exclusively? Do you think that any individual can use all types about equally well?
6. Billett states that most of the facts and theories about provisions for

differences are still reposing on library shelves and seldom are incorporated into practices of secondary schools. How do you account for the condition described by Billett?

7. With the various plans for providing for differences in mind, work out what you consider the ideal way to provide for differences in mixed classes.

RELATED READINGS

BENT, R. K., and KRONENBERG, H. H. *Principles of Secondary Education*, pp. 324–46. 2d ed. New York: McGraw-Hill Book Co., 1949.

BILLETT, R. O. *Provisions for Individual Differences, Marking, and Promotion.* (National Survey of Secondary Education, Office of Education, Bull. 17, Monograph 13.) Washington, D.C.: Government Printing Office, 1932.

BURTON, W. H. *The Guidance of Learning Activities*, pp. 270–84. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

COLE, LUELLA. *Psychology of Adolescence*, chap. xv. 3d ed. Rinehart & Co., 1948.

DODDS, B. L. *That All May Learn.* (National Association of Secondary-School Principals Bulletin, Vol. XXIII.) Washington, D.C.: National Education Association, 1939.

DOUGLASS, H. R., and MILLS, H. H. *Teaching in High School*, chap. xix. New York: Ronald Press Co., 1948.

GOETTING, M. L. *Teaching in the Secondary School*, chap. iv. New York: Prentice-Hall, Inc., 1942.

KRUG, EDWARD, and ANDERSON, G. L. *Adapting Instruction in the Social Studies to Individual Differences: Fifteenth Yearbook of the National Council for the Social Studies.* Washington, D.C.: National Education Association, 1944.

RUEDIGER, W. C. *Teaching Procedures*, chap. xxii. Boston: Houghton Mifflin Co., 1932.

SKINNER, C. E., *et al. Elementary Educational Psychology*, chap. vii. New York: Prentice-Hall, Inc., 1945.

WASHBURNE, CARLETON. *Adjusting the School to the Child.* Yonkers, N.Y.: World Book Co., 1932.

CHAPTER XIV

PRINCIPLE 7: TEACHING SHOULD BE DIAGNOSTIC AND REMEDIAL

IN FULFILLING the six principles of teaching already treated, several occasions were met in which it was necessary to diagnose and remedy difficulties. As no extended treatment of diagnostic and remedial teaching was attempted previously, this principle of instruction will be developed in greater detail in this chapter.

Meaning of a difficulty.—In general, a difficulty is a point in learning at which no further attainment of an aim can go forward effectively, if at all, without an adjustment on the part of the learner. Sometimes the adjustment is so difficult to make that progress is impeded considerably; at another time, the correct adjustment cannot be made; and, still again, a wrong adjustment may be made. That which interferes with, or hampers, or halts progress is a difficulty.

The author recalls the time when, as a Freshman in high school, he gave a talk on "How Locks in the Panama Canal Work." I said, "They first run the ship into a long narrow place, and then they close the lock behind the ship." About this time, the teacher said, "Use the impersonal; it would sound better." Was she talking Greek to me or was she reprimanding me? I did not know. Again I went on with "They then let water into, etc." Again the teacher said, "Use the impersonal and eliminate the *they*." Should I sit down or continue? I continued with, "They then, etc." The teacher said, "Well, go ahead, you don't seem to want my suggestion." Learning, as far as my grasping her suggestion went, was completely halted, and it could not go on until I made an adjustment. It was not that I wanted to be rude or rule out her suggestion; I simply did not know what she was talking about. For her to give me a low grade in courtesy or to consider me a failure in English would have been decidedly unfair without her first attempting to diagnose and correct my difficulty.

The first demand upon the teacher in helping pupils to over-

come difficulties is some notion of the causes which prevent the attainment of aims. Lack of industry and lack of intelligence are too frequently mistaken as the causes of pupils' failure to progress. Both of these are causes, but they should not hide other causes too quickly and predestinatingly. There are causes for lack of learning, and it is a teacher's responsibility to discover the true causes and to remove them to the best of her ability. "So you can't remove parentheses (in algebra) yet, even after the good explanation given in our text"; "And here you are, unprepared to explain the banks and the banking system in Jackson's administration, in spite of my warning given yesterday at the close of the period"; "Alas, what shall I do with a class that can't trace the connection between Faraday's simple induction experiment and the electric dynamo of today! Faraday might just as well have hunted rabbits for all the good his great work means to you. Get your books out and make use of your minds." These are examples of expressions denoting no respect or regard for certain obstacles confronting young pupils. And so the young are expected to assimilate quickly and unmistakably the thoughts and philosophies and discoveries of the sages and thinkers of our race! A textbook and a study of that book will do the trick! The teacher is supposed to be only a policeman! To keep traffic (learning) moving! Needless to add, a whistle or a move of the arm is not enough to keep learning moving in all cases. The stalled car (pupil) needs different treatment. Removal of parentheses, comprehending the banking situation in Jackson's administration, and tracing the applications of Faraday's discovery are not toy concepts. In all probability, the pupils have not lived or experienced any of them; perhaps they have never even heard of them; perchance these concepts are abstract and theoretical, technical and scientific. So in school learning, many similar and equally difficult concepts stand in the way of achievement. The causes of difficulties together with brief interpretations of the nature of difficulties are essential in subsequent diagnosis.

CAUSES OF DIFFICULTIES

General causes.—While diagnosis is commonly thought of in connection with learning subjects, some consideration should

also be given to general causes which might lie behind special or specific subject difficulties.

1. *Health.*—Psychologists have pointed out that the whole organism operates while study progresses, and that a weakness in the organism at one point may interfere seriously with the proper functioning of another part of the organism. If the body as a whole is not sound in every respect, it cannot function as an integrated and balanced learning organism. It is probably unlikely that an organism is perfect, so there should be constant observation to detect imperfections which can be corrected or, at least, alleviated.

Most closely associated with learning are those phases of health related to sensory organs, especially the eyes and ears, because it is through these organs that stimuli from the school environment reach the mind. Poor vision produces eyestrain and headaches which seriously incapacitate an individual for study of printed materials; and poor hearing, although not quite so serious as poor vision, interferes with those parts of classroom learning dependent upon the spoken word.

Physical fitness and stamina support continuous and concentrated application in work, and work of a mental nature also draws heavily upon a healthy constitution. In cases where progress in school work is based upon quantity, due consideration should be given health if the amount of work expected is not forthcoming. Individual differences include health as a differential.

2. *Emotional disturbances.*—Adolescents have their emotional strains just as do adults; the causes may be different, but the effects are the same. Causes are worry over failures, fear of teachers, dread of criticism, dislike of subjects, anxiety over grades, discouragement in social relationships, shame over family troubles, and sorrow over bitter experiences. Some young persons are shy and bashful; others are afraid of the opposite sex; and still others are timid and receding. These and other causes of emotional disturbances make mental and physical effort difficult, sometimes impossible. Continued disturbances interfere seriously with health, happiness, and satisfactory progress.

3. *Intelligence.*—Since intelligence is measured indirectly by

ability to do abstract thinking, to solve new problems, and to do other tasks requiring mental capacity, then ability to progress in school is likewise dependent upon intelligence. Irion found that ninth-grade students with I.Q.'s below 100 encountered serious difficulty in understanding portions of *The Spy, Julius Caesar, Origin of the Species,* and the poem "The Destruction of Sennacherib."[1] Other subject fields also include understandings and interpretations which make demands upon intelligence before real meanings emerge, and, if the proper amount of intelligence is not possessed, profundity in learning cannot be expected.

Specific difficulties.—Those difficulties coming under this category are considered specific because they are related to definite activities found in the learning process itself or to closely related factors which affect the efficient operation of learning.

1. *Interest.*—While interest in itself is not a learning process, it does influence the extent to which mental processes are utilized, and, if the processes are not brought into play, no abilities are developed. As this topic was developed under the fifth principle of teaching, only mention will be made of it at this time.

2. *Definite objectives.*—Knowing the ends desired gives study a definite direction and a standard of completeness. Hurriedly made assignments, insufficiently developed approaches, and incomplete notions of attainment leave many pupils vague as to the expectations in the teacher's mind. Occasionally, pupils will have enough judgment to evaluate the aims accurately and adequately; but more often pupils do not see the full import of the aims, and the resulting preparation, although conscientiously made, falls far short of genuine mastery.

3. *Verbalism.*—The memorization of words without understanding the meaning contained in the words is known as verbalism. A little girl had memorized "The little brown thrush sat up in a tree," etc., and then when asked, "What color was the thrush?" answered, "Red." Very often learning becomes the mere repetition of words, and the meanings are not comprehended. Frequently, meaningless repetition of words passes for learning, even by the teacher, because she may be deceived into

[1] T. W. H. Irion, *Comprehension Difficulties of Ninth Grade Students in the Study of Literature* ("Teachers College Contributions to Education," No. 189 [New York: Columbia University Press, 1925]).

believing that a flow of words is accompanied by a flow of ideas. If there are meanings which draw upon words for expression, then words serve a purpose, but memorizing words seldom, if ever, generates meanings. Verbalism, if mistaken by the pupil and the teacher for real learning, must eventually result in sacrifice of comprehension, retention, and application. Learning without these three qualities is surely subject to rapid evaporation, yet pupils will resort to verbalism unless teachers direct study wisely and require learning which does not stop until basic understandings and interpretations emerge.

4. *Vocabulary.*—Because meanings are conveyed by words, a vocabulary is essential. Both in receiving and in conveying ideas words are instruments. One cannot follow oral or written discourse unless he is equipped with receiving apparatus in the form of vocabulary, and neither can one express ideas unless he has sending apparatus in the form of vocabulary. It is the former that is imperative in deriving ideas, but both are really needed before vocabulary is adequate.

The following passages were selected at random from a history textbook for high schools:

> The Territories while in their infancy were to be treated as colonial dependencies, but as soon as they were large enough to govern themselves they were to be clothed with all the powers and rights possessed by the original States.

> The colony, being as cosmopolitan in matters of religion as it was in other matters, had within its borders almost every denomination that could be mentioned, and there was no one church that greatly overshadowed the others.

> Under these favorable conditions the growth of manufacturing in the years following the war was unprecedented.

> This system of municipal organization, which originated in Galveston after the great inundation in 1900, had for its aim the focusing of responsibility in the management of city affairs and the elimination of partisanship in the election of city officers.

> A legal victory had been gained by the dissolution, but its economic effects were imperceptible; competition in the industry affected was not restored; monopoly was not checked.

Of course, the passages are well written and precise, but words such as "unprecedented," "inundation," "cosmopolitan," and "imperceptible" are difficult for young persons, and the interpretations given to the expressions "clothed" and "overshadowed" may be too literal. Technical terms such as "municipal," "partisanship," "economic," and "monopoly" require specific interpretations, otherwise the true implications are missed.

5. *Reading and study habits.*—When a pupil reaches the secondary level of education, his mechanical skill in reading should be fairly well established; but, as education is a continuous process and requires many years before a high degree of ability is gained in many particulars, so the reading and study habits especially need stimulation throughout all levels of formal schooling. Those phases of learning which need strengthening are associated with the evaluation of materials, discovery of causal relationships, and the unification of materials into meaningful concepts. In addition, the realization that study is work and that concentration and application are essential must be experienced and believed in by adolescents, otherwise they become shiftless and spasmodic workers and inefficient learners.

6. *Experience.*—Closely associated with verbalism is experience. Sensory-experience learning gives a background of percepts which are basic in building more involved meanings in social, political, economic, scientific, mechanical, and other aspects of life. It is not necessary to experience directly or in full many situations in order to comprehend them, because in imagination considerable reconstruction of experience is possible and obligatory. However, there must be something as a starting-point, otherwise reconstruction cannot get under way. Such concepts as monopoly, competition, and partisanship can be experienced directly as they operate on the playground, in school, and in the community; by enlargement or reconstruction the concepts can encompass the broad meanings as applied to economic and political problems.

Wesley supplies a few illustrations which are appropriate at this point:

A class was studying the subject of transportation and came to a consideration of the transfer of money by means of checks and money orders. Several members had received checks or money orders through the mail. The transfer of money by telegraph was then mentioned. Some of the pupils were frankly incredulous, for they apparently tried to visualize a check or a sum of money gliding along the wires. But one alert boy came to the rescue and told how his father had sent him some money by telegraph when he was in a distant city. Such a transfer was real to him because he had had the experience.

Another example is that of a teacher who was describing a siege. She commented upon the enormous advantage which the defendants had because of several well-manned bastions. Inquiry disclosed the fact that only two of the class had ever seen a fort, and neither of them had any idea of what a "bastion" was. The experiences of the class were too limited to render the concept of any immediate value.

Many topics in history fall outside the experiences of the pupils. Consider, for example, the Diplomatic Revolution of 1756. "Diplomacy" itself is a rather nebulous concept, and its chaotic nature is emphasized by tying it to an apparently distorted use of the word "revolution." The result is that the diplomats, if they are mentioned at all, remain shadowy figures, and the pupil secures only a vague and unreal idea of this significant and dramatic shift in European alignments. This illustration emphasizes the point that the materials of study must be within the range of experiences containing similar elements, and those similar elements must be identified and related to the new materials.[2]

Whenever experiences are not sufficient to enable a pupil to visualize or reconstruct the content conveyed by words, there are bound to be difficulties and serious ones.

7. *Generalizations.*—Rules, laws, principles, definitions, formulas, and generalizations of all kinds and in all subjects are difficult to acquire. To one who has experienced true learning as well as inefficient learning, the truth in the preceding statement has a personal touch; to one who has experienced only inefficient learning, the same statement has only passive significance. Unless a sufficient number of experiences precede the final statements of the generalizations, these generalizations mean nothing more than the sounds of words grouped together, with no semblance of meaning. Only as meanings emerge is learning real. The meanings are difficult; the road to mastery is rough.

[2] E. B. Wesley, "Diagnosis in the Social Studies," chap. xv of *Educational Diagnosis* (Thirty-fourth Yearbook of the National Society for the Study of Education [Bloomington, Ill.: Public School Publishing Co., 1935]), pp. 317–18.

Teaching in the face of these situations needs to be substantial; that teaching which is wholly devoted to testing and checking and recording grades is a poor substitute.

8. *Applications.*—College students, after taking a course in educational psychology, are often unable to apply the laws and principles of learning in actual cases. Probably application of knowledge was not an aim of the course. Even experienced teachers have extreme difficulty in showing how they apply psychology in their teaching, and they generally come to the exhaustion point after stating that they try to develop interest. A little girl in explaining "The early bird catches the worm" said, "The worm's eyes are not very wide open, and the worm doesn't see the bird coming." What caused the girl to give this explanation? What knowledge of psychology should a teacher apply in order to have the girl secure the right meaning of the proverb? Application of knowledge to life-situations is an important part of learning, but many difficulties may be encountered before correct applications are made.

9. *Abstractions.*—Abstract and theoretical ideas are always difficult. The atomic theory in chemistry, the governments of ancient or foreign nations, the religions of ancient peoples, the problems of currency and finance at home or abroad, electrical meanings and measurements in physics, negative numbers in mathematics, constructions and idioms of foreign languages, and microscopic phenomena are examples of abstract and theoretical concepts. In spite of study and contemplation, not even the best pupils are able to do very much with these abstractions. When these ideas are considered valuable and necessary, something more than mere hope on the part of the instructor is needed as a stimulus to attain them; there must be a concentrated attack upon them by the very best teaching.

10. *Interpretations.*—All aims concerned with the philosophies and interpretations of life and living are generally puzzling to young people. Beginning with a simple adage, such as "A bird in the hand is worth two in the bush," and ending with "The paths of glory lead but to the grave," there are innumerable adages, maxims, poems, stories, essays, and allusions to life and living.

"The quality of mercy is not strained," but some mind may be strained in interpreting that line; Emerson wrote "Compensation," but some pupils while reading it may exclaim, "Oh, what's the use!" How easy it is for some gray-headed seer to express the philosophies of life, but how difficult for some young high-school pupils to live and understand as the seer lived and understood. If these interpretations and philosophies are understandings to be secured, then let there be teaching to realize them and not merely the making of the assignment followed by testing to see what the pupils have or have not memorized. A good football player cannot be made by just having him wear cleated shoes, and a pupil cannot get the ideas of a seer by having him memorize the words of the seer. Let there be direct teaching then, in these instances; there is no alternative.

Anticipating difficulties.—In anticipating the interferences in learning, as was done in the preceding discussion of causes of difficulties, the diagnosis takes place before learning has really begun; but, even so, this method plays a part, because stress can be placed upon those portions of the materials to be learned before actual exertion begins. The exertion may be made more profitable if the anticipated difficulty is approached and stressed, so that the difficulty becomes surmountable. Sometimes pupils exert themselves with no possibility of surmounting the difficulty; in such cases, energy has been expended but learning has remained stationary and ambition has weakened. Of course, the teacher is expected to use good judgment in anticipating troubles and not to rob pupils of fruitful benefits derived from self-exertion and self-activity; on the other hand, self-exertion with no success is also profitless and dissatisfying.

The results of research furnish valuable information as to the difficulties met by pupils in learning various divisions of subject matter, and it is quite likely that the same difficulties will be encountered by other pupils. Knowing that difficulties of a particular nature are bound to arise, the teacher is in a better position to detect these difficulties, to stress the points that need careful watching, and to make pupils aware of probable future difficulties in their preparation of assignments. Brueckner has

investigated the difficulties pupils have in solving problems in arithmetic. His conclusions are:

In addition to inaccuracy of computation, the chief factors contributing difficulty in solving conventional verbal problems are

(1) failure to comprehend the problem in whole or in part, owing to inferior reading ability, difficulty of the situation presented, inability to visualize the novel elements in the situation, and similar conditions;

(2) carelessness in reading, resulting in misreading, or the omission of essential ideas;

(3) confusion of thinking, resulting in the random trial of any process that may occur to the pupil;

(4) lack of knowledge of essential facts, such as how many inches there are in a yard, of formulas, such as how to find the perimeter of a rectangle, and the like;

(5) inability to perform the computations involved;

(6) carelessness in arranging written work and general lack of neatness;

(7) lack of interest resulting from failure of the pupil to grow in ability to solve problems, the unattractiveness of the instructional materials, their difficulty, and the like;

(8) failure to grasp the quantitative relations involved in the problem, owing to lack of vocabulary or lack of understanding of basic principles, such as the relation between selling price, cost, profit, and margin; and

(9) lack of an efficient method of attack in solving problems.[3]

Smith, in commenting upon the investigation of difficulties in English, writes:

In general, they reveal as a primary problem weaknesses in the use of verbs; that is, in such elements as failure of the verb to agree with its subject, confusion of past and present tenses, interchanging of past tense and past participle, and use of a wrong tense form of the verb. Syntactical redundancy looms large in the elementary-school studies; so also do the improper uses of the pronoun and the double negative.

What is of greatest moment is the fact that such studies reveal a few items as responsible for a large proportion of the total number of errors. Charters suggested that elimination of error in fourteen common verbs would do away with sixty per cent of all oral errors made in his study. The recent investigation in Madison shows four items responsible for more than half the total number of errors from kindergarten through the sixth grade: (1) use of the double subject, (2) use of *ain't* or *hain't,* (3) confusion of *saw* and *seen,* and (4) use of the double negative.[4]

[3] L. J. Brueckner, "Diagnosis in Arithmetic," chap. xv of *Educational Diagnosis* (Thirty-fourth Yearbook of the National Society for the Study of Education [Bloomington, Ill.: Public School Publishing Co., 1935]), p. 294.

[4] D. V. Smith, "Diagnosis of Difficulties in English," chap. xiii of *Educational Diagnosis* (Thirty-fourth Yearbook of the National Society for the Study of Education [Bloomington, Ill.: Public School Publishing Co., 1935]), p. 238.

If the difficulties likely to be encountered in study were anticipated more accurately, much of the confusion in attacking a new lesson or problem could be eliminated immediately. Of course, it is expected that clearing up too many points may take the benefit out of initial attack, but then again it is not wise to leave obstacles in the way to increase bewilderment and discouragement. Surely, those who have been "through the mill" should be able to forecast confusion points. Psychology should offer some assistance here, too. Objectives that require the operation of the highest mental processes must necessarily offer difficulty. Insufficient experiential background will always forecast trouble ahead. New materials, as a rule, deserve some attention as difficulty generators. The point in the discussion so far is that teaching should take into consideration these conditions and by proper treatment eliminate obstacles bound to arise. Such topics or materials as negative numbers, exponents and their laws, certain axioms, logarithms, charters, constructions in English, figures of speech, logrolling, and abstractions of all kinds are bound to cause needless worry if they are not made intelligible to pupils from the first. Even after giving the initial interpretation there will still be enough thinking left for pupils in gaining a complete understanding. If there are places in school work where teaching is necessary, then one of those places is at the point where materials are in themselves difficult to grasp.

METHODS OF DIAGNOSING DIFFICULTIES

Responses give evidence of learning. The analysis of responses to learning situations is the essence of diagnosis. The learning situation provides opportunities for oral and written responses, and, on the basis of responses made, the difficulties are discovered. Diagnosis provides pupils with opportunities to make responses and then continues with an analysis of the causes of the responses made. Of course, satisfactory responses are not followed by analysis unless the causes of satisfactory reponses are desired. As generally used, diagnosis is a search for causes of unsatisfactory responses or reactions.

Suppose the case of the little girl who said that the bird caught

the worm because the worm's eyes were not wide open is considered from the standpoint of diagnosis. The opportunity to make the response was provided by a question as "What does the proverb, 'The early bird catches the worm,' mean?" The answer is the response. An analysis of the causes which made the girl respond as she did is required. Evidently the girl used her past experiences, or apperceptive background, to explain the proverb. In this instance, apperception was employed, but it produced the wrong conclusion. Some of the methods utilized during diagnosis will be next in order.

1. *Answering questions.*—One opportunity for responses is to answer questions, and a keen instructor can discover difficulties by analyzing answers to questions. No answer, the wrong answer, the right answer, or a partially right answer can mean a number of things. It might mean that the pupil did not study, that he could not grasp, that he grasped, that he memorized something he could not apply, that the question was too difficult for the best pupils in class, that not enough reasoning had been done, or that words failed to connect at all with realities for which these words were intended.

2. *Making applications.*—Another occasion for a response is that one which shows whether a pupil can apply what he appears to know in terms of words. A teacher of physics, after his class had studied Archimedes' principle (a body immersed in a liquid is buoyed up by a force equal to the weight of the liquid displaced), wanted to know why the stones on the shore or in the shallow water always hurt more to walk upon barefooted than the stones out where the water is four or five feet deep. One pupil responded, "The stones on the shore are sharper and hurt the feet more." It is quite evident that a pupil who really knew Archimedes' principle would not have neglected it so innocently and completely in this situation.

3. *Giving illustrations.*—Responses for illustrative purposes also serve well in detecting the essence of the learning going on or completed. "You say that you know what a metaphor is. Give me a few illustrations. Illustrate what you mean by saying that the Constitution is the supreme law of the land." If a pupil

cannot illustrate, there is good reason to believe that he is merely repeating words which mean little or nothing to him.

4. *Oral tracing of steps.*—Very often difficulties can be found by having a pupil trace orally the steps followed during study. In the seventh grade a boy secured an unreasonable answer to this problem in laying linoleum:

A room is 20 feet 3 inches long and 16 feet wide. At $0.60 per running foot, how much will it cost to cover the floor with linoleum 4 feet wide, 6 inches being allowed for matching? The linoleum runs lengthwise.

His answer was $60.75; the right answer was $49.50. The teacher, realizing that something was misunderstood in the work, asked the boy to tell her just how he solved the problem. Here is his explanation:

It says the linoleum is 4 feet wide and 6 inches are allowed for matching. The first strip is put down; you don't have to cut any off the first strip. Since the room is 16 feet or 192 inches wide, there will be 144 inches left to cover after the first strip is put down. From each of the other strips 6 inches are cut off the whole side for matching, so each strip will be 42 inches wide. Divide 144 by 42 and you get 3 3/7 strips, but you must buy 4 strips, then the first strip must be added so there are 5 strips. Each strip is 20 1/4 feet long, and 5 × 20 1/4 feet equals 101 1/4 feet. The linoleum will cost 101 1/4 × $0.60 or $60.75.

Taking a pencil and a piece of paper, the teacher drew the floor with the first strip of linoleum laid, and she also sketched the end of the roll where the cut was made.

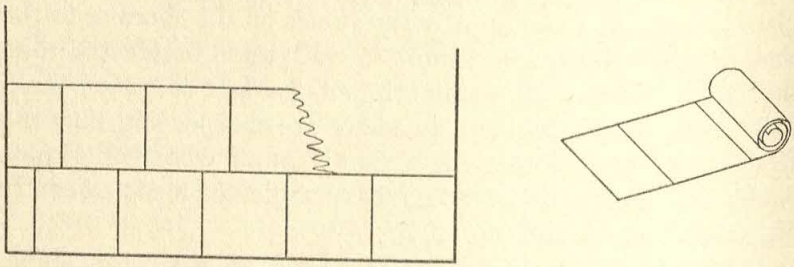


Fig. 11

Teacher: How will the next strip look if we put it down? (At this stage she drew in the second strip [see Fig. 11].)

Pupil: The figures don't fit together as they should.

T.: What would you do about it if you were laying the linoleum?
P.: I would move the second strip up until the figures did fit right.
T.: Yes, but the wall is in the way.
P.: I would cut off some of the linoleum.
T.: How much?
P.: Just enough to make the figures fit.
T.: Probably that is what the problem means by allowing for matching. Since we do not have the linoleum here, we must consult the problem to see how much should be cut off the ends of the remaining strips. How much does the problem state is cut off?
P.: Six inches. (In a few minutes the boy had the correct answer.)

5. *Diagnostic tests.*—Diagnostic tests can be employed to discover difficulties. Such tests, whether teacher-made or standardized, cover one phase of a subject and cover it thoroughly. If the purpose of the test is to discover how well a certain division or unit of a subject is known, it can be seen that the portion covered must be covered completely, otherwise chance learning might play a large part in the results obtained. One investigator[5] found that, in working with decimals, there were 114 different kinds of errors made; these errors extended to the four processes: addition, subtraction, multiplication, and division of decimals. Not all the errors occurred with the same frequency. As there are over one hundred distinct operations that one should know to solve all cases in decimals, then a test, to be thoroughly diagnostic, should contain exercises involving all the operations. It can be seen that a test involving only ten of the operations would not enable one to diagnose very well a pupil's ability to work with the fundamental operations in decimals.

Diagnostic tests in other subjects should be equally thorough. Suppose, after teaching that the subject and predicate must agree in number, one wishes to determine how well those taught can keep agreement between the subject and predicate. A diagnostic test is constructed. What should be included in the test? An answer will depend upon what was taught while the topic was developed. Anyway, the point here is that there are many distinct ideas to be gained before the rule can be practiced widely and accurately.

[5] L. J. Brueckner, "Analysis of Difficulties in Decimals," *Elementary School Journal*, XXIX (September, 1928), 32–41.

A few years ago an English teacher in the author's class constructed, with the assistance of a college professor of English, a test which covered practically all the constructions involving number agreement employed in everyday expression.

SUBJECT-VERB AGREEMENT IN NUMBER

I. Copy the correct word in the blank provided.

1. One of those men (is, are) ——— my brother.
2. The pupils of this school (is, are) ——— enthusiastic.
3. One million dollars (is, are) ——— a great deal of money.
4. That kind of apples (is, are) ——— expensive.
5. John is one of the boys who (is, are) ——— absent today.
6. The scissors (is, are) ——— not very sharp.
7. Our committee (is, are) ——— sharply divided in their opinions.
8. Either George or John (is, are) ——— going.
9. It is I who (am, is) ——— in charge of the desk.
10. Two-thirds of the number (is, are) ——— twenty.
11. Two-thirds of the boys (is, are) ——— absent.
12. Mathematics (is, are) ——— a useful course.
13. Measles (is, are) ——— a contagious disease.
14. Seven times one (is, are) ——— seven.
15. There (is, are) ——— a great many children in the audience.
16. The number of persons present (was, were) ——— large.
17. The curricula in that school (is, are) ——— different from ours.
18. He (don't, doesn't) ——— do as his father said.
19. Both my sister and my aunt (was, were) ——— caught in the storm.
20. We spent three hours on this problem and (was, were) ——— unable to do it.
21. The new committee (is, are) ——— in session.
22. Either John or his parents (is, are) ——— going.
23. A great majority of persons (is, are) ——— in favor of the project.
24. *The Arabian Nights* (is, are) ——— well worth enjoying.
25. Moonlight nights (is, are) ——— well worth enjoying.
26. Languages, science, mathematics, and history (is, are) ——— taught in high schools.
27. A series of games (was, were) ——— played last week.
28. Apples (is, are) ——— one kind of fruit.
29. Why (is, are) ——— George and his friend leaving?
30. The United States (is, are) ——— respected among the nations of the world.
31. A statesman and patriot (is, are) ——— needed for the office.
32. (Is, are) ——— John or Mary going?
33. Each boy and each girl (is, are) ——— to come at two o'clock.
34. Not one of all those pictures (was, were) ——— saved.

35. This is one of the suits that (is, are) ——— being sold at a reduction.
36. Both Mary and I (am, are) ——— going.
37. Either James or I (am, are) ——— going.
38. This group of boys (is, are) ——— working on their various problems.
39. The chief difficulty (is, are) ——— these miners.
40. English, together with many other important subjects, (has, have) ——— been in the curricula of our schools for a long time.
41. This group of girls (is, are) ——— going immediately.
42. Politics (has, have) ——— grown in importance in our country.

II. Place a printed capital "R" on the line if the right verb is used, and a capital "W" if the wrong verb is used.

——— 43. The deer is large.
——— 44. Those deer are large enough.
——— 45. Theirs is newer than ours.
——— 46. Theirs are newer than ours.
——— 47. Everybody thinks that he is the winner.
——— 48. Athletics are important for boys and girls.
——— 49. Athletics is important for boys and girls.
——— 50. Some of the neighbors are attending.
——— 51. Most of the trees are oak.
——— 52. Most of the meat was eaten.
——— 53. Some of the corn is rotting.
——— 54. None of the members have organized into groups.
——— 55. Most of the sugar is sold.

Diagnostic tests reveal points of weakness, but they cannot reveal the causes of shortcomings in achievement if the shortcomings are due to faulty mental processes. If the errors happen to be purely mechanical, as in certain arbitrary forms in punctuation and facts in history or science, then more drill on essentials may be the only mental process needed; but if the mistakes are caused by weak experiential background, poor reasoning, or faulty judgment, the causes must be discovered by other means of diagnosis. A boy in high school always used the singular form of the verb when he began sentences with *there, where, when, what, why,* and *how,* regardless of whether the subject was singular or plural. During a conference the boy explained that he thought the subject of a sentence such as "There is two good reasons" was *there,* and it was singular. For the same reason he employed *when, what,* etc., as singular subjects. In this case, a diagnostic test could unearth the error, but not the mental

process causing the wrong choice of the verb. Evidently, the inverted order of words in a sentence bothered the boy, because he soon corrected the mistake after his mental process was revised.

6. *Observation.*—While pupils are under the supervision of a teacher, she can gain much information about them by observing their responses and especially those reactions which are difficult to discover by the methods of diagnosis thus far mentioned. Industry, perseverance, thoroughness, interest, politeness, honesty, speech defects, grammar, sentence structure, study habits, judgment, and personal characteristics can be observed directly or indirectly. Inattention and lack of perseverance are as likely to interfere with achievement as are faulty mental processes and lack of experiences. Emotional and social maladjustments can be quite accurately diagnosed at times by observing the symptoms of these disturbances. To a keen observer, no pupil reactions escape, whether they be oral, written, or gesture.

7. *Conference.*—Diagnosis should contain much of the human element, that is, pupils should feel free to consult the teacher about their difficulties in learning, and the teacher should be a willing listener and helper. A barrier between pupils and teacher discourages free discussion and closes many avenues of profitable diagnosis. Conferences provide opportunities for the teacher and the pupil to meet on common ground and to be free and frank in talking over problems and difficulties. During a conference all methods of diagnosis can be utilized, even the diagnostic test. A wise policy to follow during conference is to let the pupil have the floor. He should have the chance to relate his troubles. It is from his testimony that the teacher gets the data which she uses in the analysis of his learning perplexities.

8. *Quizzes and examinations.*—Since so much emphasis has been placed upon diagnostic tests, one might surmise that the only test suitable for diagnosis is the diagnostic test. On the contrary, the main use of all examinations should be for the purpose of diagnosis. Testing is not a side show, a by-product, or an extracurricular activity in teaching. It is an integral part of instruction, and to consider quizzes and examinations as means only to

get grades for report cards is unjustifiable. If errors and misunderstandings and misinterpretations are brought to the surface in examinations, then to have these weaknesses reflected only in low grades and not at all as starting-points in further diagnostic and remedial teaching is a misuse of examinations. As this topic is treated in one of the following chapters, further clarification is unnecessary at this time.

Diagnosis a continuous process.—No one principle of teaching is carried forth separately for very long at one time; all principles move forward continuously. At all times a teacher is thinking about what should be learned, how it should be learned, and what the difficulties might be. When she reaches the stage of knowing what the difficulties really are, her next step is to remedy existing weaknesses.

REMEDIAL TEACHING

Up to this time the discussion has related chiefly to difficulties and their discovery. Following the discovery comes the phase of teaching which has for its purpose the correction of the weaknesses discovered. Would that there were some key which would unlock the door standing between the pupil and his aims; some key that would fit every door; some key that could always be turned in one direction; some key, a master-key, that would answer for every locked door. Alas, there is no one key! Pupils differ so widely in interest, capacity, keenness, experience, and ambition that almost every pupil presents a different problem in learning.

Knowledge of learning basic.—Diagnosis must come first, and, if it has been done reasonably well, the teacher possesses the beginning information upon which to initiate her remedial measures. At no other place in teaching is a knowledge of how pupils actually learn needed more than in guiding a pupil out of perplexity into comprehension. In short, remedial work is chiefly judging the way a mind should function in making a needed adjustment, and then setting conditions so that the mind follows the way. The teacher mentioned in the preceding linoleum problem detected immediately that the difficulty was a misinterpre-

tation of matching, so she brought in the sensory-experience type of learning as the remedy. To enumerate a long list of what-to-do's for this and that difficulty would probably do more harm than good, because one would stop observing and thinking and would revert to mechanical memorization; and, when that happens, one ceases to be a thinker and becomes a rule-of-thumb performer in a field where rule-of-thumb devices will not work. If the difficulty is caused by lack of effort, then the remedy must be found in an understanding of the forces supporting human motivation—there is no master-key here, either. Whatever the remedy may be, it must grow out of an analysis of the individual pupil, his learning ability, his reactions, his background, his native capacity, and his possessions and equipment for thinking, understanding relations, and meeting situations. There is no marked road to remedial teaching.

All that a teacher knows about guiding learning must be utilized wisely when pupils encounter difficulties. Many aims can be fully attained by independent study, but many cannot be, and in connection with the latter some assistance from the one qualified to give such assistance is essential. One of the responsibilities of a teacher is to direct study when the circumstances are difficult, and in no other circumstances is the time of a teacher more profitably given than in assisting and guiding learning when it is confronted with almost insurmountable hindrances. Direct and pointed instruction under troublesome conditions does not violate any of the principles of growth; in fact, it is in keeping with growth; it affords the efficient use of self-activity in the present and it prepares the way for self-activity to function in the future.

Teaching to remove difficulties consists in the selection of psychologically sound activities for pupils to employ in their attempts to overcome the difficulties or their endeavors to gain the concepts. Many of the activities stressed in an earlier chapter of this book, under types of learning, apply at this time, so closely and forcibly, that the chapter should be reviewed if necessary.

Let us assume that you are a teacher. You find that pupils,

after study, are unable to explain or to show any understanding of how the shifting of a lever in an automobile regulates speed and direction (forward and backward). At this time several courses of action can be followed. One can demand more study; he can explain the difficulty; he can require pupils to memorize the words in the textbook; he can omit that part, if omitting is within his jurisdiction; or he can pursue some other course. But, under the assumption that the information must be acquired, something must be done to insure acquisition. The idea is difficult, but it must be gained; there can be no dodging of the issue. At such a crisis in learning, direct teaching is in order. In this case, the lack of percepts is without doubt the source of the trouble. If so, then drawings, pictures, or the gears of a real automobile are needed to assist in building up the percepts. Probably an explanation and an illustration of the size of the wheels and the number of cogs on the wheels are needed to show the relationship between revolutions and speeds. When difficult ideas cannot be gained in study, direct teaching is the only course to pursue. The instruction may take the forms of inductive and deductive development, illustration, demonstration, explanation, sensory-experience teaching, reconstruction of past experiences, or any other forms necessary to overcome the difficulty.

Procedure stabilizers.—Occasionally, difficulties can be removed by generating an idea which will help establish direction in study. The equality of an equation can be compared with balance on a teeterboard or balance on the ordinary laboratory scales. This procedure stabilizer has often kept work with equations on the right track, because, as soon as one member of the equation is changed in any way, the other member must be considered. It is much better to fulfil this idea in working with equations than to bother with shifting, changing signs, crossing the bridge, or some other device in keeping equality. So many mistakes are caused by a lack of knowing what the thing is all about.

In the field of English there would not need to be this constant drill upon subject and predicate, simple and compound, together

with modifiers and phrases and clauses in order to write a complete sentence if pupils were given some feeling of what a complete thought is. For, after all, a sentence is a complete thought expressed in words, and, if one is sure that the thought is complete, then the words used to express the thought must form a sentence. Punctuation would almost take care of itself if one would keep his readers in mind and try to decide whether they could possibly misinterpret what he wanted to express. Punctuation is the use of conventional signs to let another person know our meaning when it cannot be indicated verbally. Organization of ideas is a psychological process, not a technique; as soon as a technique is relied upon instead of sequence of related ideas, organization becomes mere guesswork. It is, for example, ideas that determine the construction and sequence of paragraphs, and not paragraphs that determine ideas.

The author remembers well the rambling and juggling he did in finding the specific heat of liquids and metals until he stumbled upon the idea that the heat gained by the lead ball must be the heat lost by the water, or the heat gained by the alcohol must be the heat lost by the iron object. The idea of gain by one becoming the loss of the other gave equilibrium which kept the solving of problems on the proper course.

Again, if one realizes that the work expended upon a machine is the work done by the machine, that is, neglecting friction, there will be some sense in wanting to know the length of the lever arm, the length of the handle, or the length and height of the inclined plane, because the work balances, and work is force acting through space. This procedure stabilizer enables one to use factual information purposefully; without this stabilization, the juggling of rules and formulas becomes the procedure in solving problems. Supply a stabilizing principle whenever possible, and there will be less juggling with no purpose and more selection with a definite purpose in learning.

The teacher as a learner.—What can I do in directing learning to help pupils overcome difficulties? This is the basic question that should be in a teacher's mind when the removal of difficulties

is essential to further progress. The following suggestive statements and questions may prove valuable:

1. What would trouble me if I were studying this material for the first time?
2. Can I see the learning as it appears to pupils, that is, can I place myself in their age and ability situations?
3. Are there words which cannot be understood?
4. Are there experiences necessary for understanding which the pupils have not had? If so, I must build up experiences by direct teaching with objects, apparatus, or any other effective visual materials. Recall the teaching of continuous night and day at the North and South Poles (chap. v).
5. Are there past experiences which the pupils do not utilize in new situations? If so, I can stimulate the recall of these in teaching difficult ideas.
6. In understanding life-interpretations, do I have pupils reconstruct and apply past experiences? Recall the teaching of "The quality of mercy is not strained" (chap. v, sec. 1).
7. I can help pupils to graph situations so that they derive the meanings. Recall the teaching of "If 130 per cent of a number is 65, what is the number?" (chap. iv).
8. Perhaps an illustration or an analogy will clear up a difficulty.
9. If rules and definitions and formulas are required, do I develop by inductive teaching a real grasp before I require memorization? Recall the teaching of the division of decimals (chap. v, sec. 4).
10. Do I know when to teach and develop meanings, or do I consider my responsibility to be merely a testing one? What if testing reveals only lack of meanings? Do I then blame the pupils and grade them accordingly?

Profit from experience.—A topic for conversation in pedagogical circles for many years has been the old saying that teachers who had great difficulty themselves in learning make good teachers. There is, no doubt, more truth in that statement than some are willing to admit. A teacher, after all, generally interprets another's learning in terms of discoveries in her own past learning, not in terms of principles enumerated in a psychology text. If, therefore, a person had varied experiences in her own past learning, she has a background which will prove valuable in the guidance of another's learning. At any rate, only that which is in the background of a teacher's mind can come to the foreground, when teaching to help others overcome their difficulties is in progress.

APPLICATION EXERCISES

1. Did you try the diagnostic test in subject-verb agreement? The correct answers, according to the person who constructed the test, are:

1. is	15. are	29. are
2. are	16. was	30. is
3. is	17. are	31. is
4. is	18. doesn't	32. is
5. are	19. were	33. is
6. are	20. were	34. was
7. are	21. is	35. are
8. is	22. are	36. are
9. am	23. are	37. am
10. is	24. is	38. are
11. are	25. are	39. is
12. is	26. are	40. has
13. is	27. was	41. is
14. is	28. are	42. has

The verbs in sentences 43–55 are right.

What were your difficulties? Do you believe the answers given are correct in every instance? If not, consult the authorities in English.

2. Prove the following theorem:

If two opposite angles of a quadrilateral are equal, and if the diagonal joining the other two angles bisects one of them, then it bisects the other.

What difficulties did you have? Can you anticipate the difficulties a Sophomore in high school might have in proving the theorem?

3. Recall some specific troubles you had in learning certain subjects in the elementary school or high school, and figure out why you had the troubles. Did your teachers diagnose your weaknesses? What did the teachers do to remedy your shortcomings?
4. Do you think that a pupil is more on guard when he takes a diagnostic test, say, in sentence structure, than he is when he writes a composition, gives an oral report, or makes a speech? Do you think it might be better to examine his compositions, examinations (essay), and other forms of written and oral expression to find his weaknesses in sentence structure than to depend upon diagnostic tests?
5. Suppose you have a boy in class who does not understand the work. You are unable to tell whether the cause is lack of study or lack of intelligence. Of course, the cause may be some other lack; but, limiting the causes to the two mentioned, what would you do to make sure that it was one or the other, or a combination of both?
6. Here are a few problems in algebra. What might be difficulties encountered by pupils in solving them?

   a) At what time between four and five are the two hands of a clock exactly together?

   b) If one book costs *c* cents, how many books can a man buy with *D* dollars?

   c) In the equation $D = \frac{1}{2}gt^2$ find the value of t.

7. How should a conference be conducted in order to secure from the pupil as much testimony as possible?
8. Do the conference, observation, and oral tracing methods of diagnosis have certain advantages over written methods? Explain.
9. "Arthur could not see Ben in the crowd because he was too short." Some pupils will look at this sentence for a long time before they see what is wrong, and then they will find difficulty in re-wording it to avoid ambiguity. What kind of remedial teaching would you undertake to eliminate ambiguity?
10. A pupil often makes mistakes that are not made by others in a class. Now, if all pupils make different mistakes, attention must be given to every individual during remedial teaching. Publishing companies issue workbooks or practice sheets which contain exercises, answers, and explanations so that it is possible for pupils to remedy their own weaknesses in use of capitals, commas, verbs, decimals, and other specific divisions of subjects without depending upon the teacher. Do you believe pupils could teach themselves with such exercises? To what extent is self-teaching possible? Prepare an exercise, say, in use of quotation marks, that could be used by a pupil who did not have mastery of this phase of punctuation.

RELATED READINGS

Barr, A. S.; Burton, W. H.; and Brueckner, L. J. *Supervision*, chap. vii. Rev. ed. New York: Appleton-Century-Crofts, Inc., 1947.

Blair, G. M. *Diagnostic and Remedial Teaching in Secondary Schools.* New York: Macmillan Co., 1946.

Burton, W. H. *The Guidance of Learning Activities*, chap. xx. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

Greene, H. A.; Jorgensen, A. N.; and Gerberich, J. R. *Measurement and Evaluation in the Secondary School*, chap. xiii. New York: Longmans, Green & Co., 1944.

National Society for the Study of Education. *Educational Diagnosis: Thirty-fourth Yearbook.* Bloomington, Ill.: Public School Publishing Co., 1935.

Ross, C. C. *Measurement in Today's Schools*, chap. xiii. 2d ed. New York: Prentice-Hall, Inc., 1947.

Tiegs, E. W. *Tests and Measurements in the Improvement of Learning*, chaps. ix–x. Boston: Houghton Mifflin Co., 1939.

Torgerson, T. L. *Studying Children: Diagnostic and Remedial Procedures in Teaching.* New York: Dryden Press, 1947.

Wood, B. D., and Haefner, Ralph. *Measuring and Guiding Individual Growth.* New York: Silver Burdett Co., 1948.

CHAPTER XV

PRINCIPLE 8: THE PHYSICAL AND SOCIAL ENVIRONMENT FOR LEARNING SHOULD BE IDEAL

FATHER: So your appetites are keen and your cells are calling for nourishment! Well, this is the only restaurant in town, and we can't drive to the next city before we eat. So we will turn off the motor, walk into this eating-place, and appease the appetites and answer the call of the cells.

MOTHER: This is a table large enough for four.

JANE: Did you ever see such a soiled tablecloth?

MOTHER: Dear me, I wish they would think of sweeping the floor some other time. That dust makes me itch.

ROBERT: Daddy, do all dogs scratch as much as that one does over there by the counter?

JANE: I don't think the manager is a very nice man; he gave us a cross look, and he didn't smile or say a word.

MOTHER: That waitress is still combing her hair over there by the dishes and the doughnuts.

JANE: Mother, do flies always know strangers?

FATHER: How close and stuffy it is in here! I'm hot, and there isn't a breath of air—every window is closed.

JANE: Daddy, you look pale.

FATHER: Come on! I can't stand this.

OUT they go! The physical and social environment should be ideal for eating; even ravenous appetites and the calling cells are hushed into numb silence when the environment is repulsive. Emotions, however, may be violently disturbed. Swearing may result. Resentment and bitterness are almost certain consequences.

Although the restaurant scene may not be exactly typical of a classroom situation, there are two aspects of the analogy which are true: one is that both the restaurant and the classroom are established for definite purposes—eating and learning, respectively—and the second is that in both places the physical and social environment seriously affects the realization of these respective purposes. In this discussion the classroom shall be considered a place where learning is the chief purpose, and it is

in this room that the environment should be kept ideal in order to realize the purpose for which the room was established. The physical and social environment conducive to better learning deserves critical analysis.

PHYSICAL ENVIRONMENT

A few illustrations of actual experiences with conditions will serve as an introduction so that the ideas and suggestions listed later will be more readily understood.

PRINCIPAL: Miss Brown, when I was in your classroom this morning, I noticed that your pupils seemed drowsy and that their faces were flushed. Glancing at the thermometer, I saw a temperature reading of 81° Fahrenheit.

MISS BROWN: I can't understand that; the room was just right for me.

PRINCIPAL: Does science give us any evidence of the influence of temperature upon physical and mental efficiency?

SUPERVISOR: Mr. French, this isn't a very pleasant day, is it? Cloudy and foggy and dark!

MR. FRENCH: These days do come, so one must keep his spirits bright when everything else is gloomy and dark.

SUPERVISOR: Mr. French, do you think that your room might be a little brighter if you had the shades all the way up? I see that you have them pulled halfway down.

MR. FRENCH: I'll try. Sure, that's much better. Funny I didn't think of that before.

These two instances illustrate typical violations of good practices in maintaining the proper physical conditions in the classroom. Below is a list of physical conditions, most of which are subject to regulation by the instructor:

1. The temperature of the room should range from 68° to 70° Fahrenheit; 70° is the maximum. Two or three degrees below 68° is permissible in machine shops, manual training rooms, and other rooms where work requires physical activity.
2. The air should be in motion; drafts, however, should be avoided. (A continuous "air bath" is essential for physical and mental efficiency. Examine intake and outlet openings; notice effect of air on light sheet of paper or light strip of cloth.)
3. The air should be pure, fresh, and clean, that is, free from noxious gases, fumes, and dust. (Dust is unavoidable to some extent in manual training and shop rooms; odor, in domestic science and chemistry laboratories.)

4. The air should be moderately moist rather than dry. A range of humidity from 40 to 60 per cent is considered the best.
5. The best light is unilateral and from the left. Additional light from the rear is permissible, but lighting from the opposite sides or from the front is not permissible. In side and rear lighting, two-thirds or more of the light should come from the side. The window nearest the front should be at least six feet from the front wall.
6. The glass area of the windows should not be less than 15 per cent of the floor area (20 per cent or more is considered ideal).
7. Blackboards should be so situated that pupils are not required to face the light while looking at them. Boards should not be located in walls with windows, especially in walls where boards would be immediately adjoining windows or placed between windows.
8. Window shades should be adjusted to secure the best lighting possible. Shades should be adjusted to protect pupils from too intense brightness of the sun, to keep the direct rays from shining into their eyes, across their desks, upon the blackboards they are using, but should be otherwise adjusted to secure the maximum light. (The upper half of the window admits two or three times as much effective light as the lower half.)
9. Pupils, under regular working conditions, i.e., seated in stationary class seats throughout the period or between class periods, should not be required to face the light. Facing a light means facing a wall with windows. Exclude laboratory work or other kinds in which pupils assume many different positions while at work. The teacher should occupy a position in the room such that pupils are not required to face the light while looking at her.
10. The room should be neat. Teacher's desk should be in order; supplies and books, neatly arranged; pupils' desks, uncarved; pupils' desks and personal property, well cared for; tables and chairs and movable furniture, well arranged; pictures, hung straight.
11. The room should be clean. Floors should be clean and free from paper, chalk, and refuse; desk, tables, lampshades, and walls should be free from dust and cobwebs; blackboards should be free from excess chalk deposits; erasers should be clean; washable articles, such as dishes, towels, and cloth curtains, should be clean; windows should be clean.
12. The room should be attractive. The room should be not barren, but homelike; pictures should be appropriate and hung in the right places; there should be well-chosen clippings and pictures and articles on the bulletin board; specimens and models should be located in convenient places.[1]

[1] F. A. Butler, "Standard Items To Observe for the Improvement of Teaching in Classroom Management" (University of Wisconsin Doctor's dissertation [Madison, 1928]). Items were derived from scientific investigations and from the outstanding authorities in fields of heating, ventilation, lighting, seating, and prevention and correction in classroom discipline.

SOCIAL ENVIRONMENT

Under this topic are found those conditions which emanate from the human side of the environment, namely, the teacher and the pupils. The classroom is a place for learning, and the social environment influences learning; hence every social factor which is beneficial should be brought in, and every disturbing or negative social factor should be eliminated. Probably the most disturbance in a classroom is caused by the misconduct of a few pupils which interferes with the work of others. This disturbance is commonly called poor discipline or the lack of good discipline; it should be called poor social environment or the lack of good social conditions. A good social environment is essential, otherwise learning does not progress efficiently, sometimes not at all. Studies made of failures in teaching show that lack of good discipline stands first or near the top in the list of contributing causes. From the teacher's standpoint, there are two aspects of discipline: (1) the preventive side and (2) the corrective side. It is impossible to treat these two aspects as distinct and separate from the complete act of good teaching; they are, indeed, bound up with good teaching in so many respects that they become a part of good teaching. While reading the lists of suggestions for prevention and correction, notice the wide range of teacher activities and traits influencing her control in the management and guidance of pupils. Pupils' good will and co-operation can be obtained by employing the proper means. The suggestions listed under prevention and correction will be of great value in guiding pupils to gain better standards of conduct.

Suggestions for prevention.—In the field of health, prevention is the watchword. Water is purified before it is drunk, and vaccination is completed as a protective measure. Equal emphasis should be given prevention as a positive factor in securing good social behavior.

1. Prevention should precede correction whenever possible.
2. The physical conditions of the room may operate to produce disciplinary situations. As far as possible, the teacher should try to make the ventilation, lighting, heating, and seating ideal.

3. The lack of dispatch in beginning the class work may lead to disciplinary situations. The class period should begin with vigor and promptness; there should be no delay due to lack of preparation.
4. The lack of dispatch in the conduct of routine matters may lead to disciplinary situations. Supplies should be handled efficiently and in orderly fashion; work materials should be supplied in sufficient numbers and conveniently; movements should cause no confusion or opportunity for disturbance.
5. Idleness is a very common source of disorder. Pupils should be profitably employed during the period; preparation should be made to keep pupils' efforts well directed; variations in abilities should be considered and provided for; plans should be worked out to secure constant and worthwhile activity during the period.
6. The teacher's position in the room frequently influences her control. The teacher should, as a rule, stand before her class while teaching, move about at times, assume a position which will command a view of every pupil, and otherwise keep in close contact with the class.
7. The teacher's alertness frequently influences her control. She should see and hear all that takes place; she should give constant attention to pupil responses. She should not be so unchanging that pupils can gauge her movements and time their acts; she should make reasonable use of her face, eyes, and hands as means of expression.
8. The pupil's location frequently determines his chance for making disturbances. Separation of "cronies" often prevents disorder; disorderly pupils at the remote ends of the class should be moved closer to the teacher. Every attempt should be made to lessen the chances for pupils to cause disorder by removing them from the influences of others of their kind.
9. As a rule, disorder should never be suggested in advance by prescribing rules, punishments, and threats for misdemeanors that have not occurred. To threaten is to challenge and often binds the teacher to a course of action contrary to the best methods of solution.
10. Personal qualities, such as cheerfulness, courtesy, friendliness, sympathy, enthusiasm, and fair play, influence the teacher's control. The teacher must make an effort to display those personal qualities that make for harmonious relations with the class.
11. Mannerisms, peculiarities in voice and dress, and poor and careless English may influence the teacher's control. Slang, unpleasant voice, extreme style in dress, personal peculiarities, and untidiness should be remedied in order to increase the teacher's influence over pupils.
12. Lack of knowledge of subject matter on the part of the teacher may lead to the loss of respect for the teacher and ultimately to loss of control of the class. There should be no lack of preparation, either daily or general, on the part of the teacher, which might lead her pupils to question her knowledge of the subject taught.

13. The failure of the teacher to teach effectively may lead to inattention and ultimately to problems of discipline. The teacher should make the subject matter understandable and interesting; she should make pupils feel that it is important. The subject matter should be applied, connected with the pupils' experiences, illustrated, made vital, rather than treated as so much to be learned, materials to be merely memorized, dry husks to eat.

Suggestions for correction.—Regardless of precautions, a few individuals will, no doubt, show misbehavior serious enough for corrective treatment. Sound practices should guide correction, otherwise correction often fails in its purpose.

1. The aim of correction should be constructive, not retributive. Correction should strengthen the pupil's self-control, self-direction, and sense of responsibility. To make correction in a spirit of revenge is not desirable.
2. The intensity of the correction should be suited to the individual. Pupils' motives differ, their temperaments differ, their sensitivities differ; discrimination is, therefore, required for each pupil.
3. There should be a definite relation between the misconduct and the correction. If possible, the pupil should be made to see the relation. The correction should eliminate the inclination to repeat the act; it should be such that undesirable associations are not formed in new directions.
4. As a rule, the group should not be punished for the misconduct of the few. This implies that only the offenders should be corrected.
5. Where correction is necessary, it should be made judiciously, without excitement or undue emotions. Outbursts of indignation and loss of temper weaken the teacher's control.
6. As a rule, reprimands should be administered privately. To reprimand before the class often makes a martyr of the offender in the eyes of his classmates.
7. Private conferences should usually precede major corrective measures. The teacher should talk over the matter with the pupil. His co-operation can often be secured outright if the conference is skilfully handled.
8. If possible, the teacher should utilize public opinion (social pressure) of the class in correcting infringements upon class rights. If the pupil can be made to realize that his classmates look with disfavor upon his conduct, he will change more readily.
9. If possible, the teacher should administer her own correction. To send all cases to the principal or some other person lessens the effectiveness of the correction and weakens the pupils' regard for the teacher.
10. Correction should be consistent and certain. All pupils should be held to the same conduct; to excuse some and correct others, to favor certain

pupils, to "tighten up" for a while and then relax, and to be spasmodic lessen the pupils' respect for the standard of conduct expected of them.

11. As a rule, the teacher should not lecture or scold her class, nag pupils, or employ ridicule and sarcasm. Animosities are created by these methods of correction, and hatreds eventually lead to disorderly conduct.
12. Corporal punishment, if ever employed, should be used sparingly, and as a last resort. This correction should be used for younger children rather than for older pupils; no cruel or inappropriate applications should be administered, and no physical harm should result.

Discipline and pupil adjustment.—Pupils who are unable to solve problems in mathematics or to construct good sentences in compositions are assisted in a helpful and sympathetic manner, and usually teachers do not become excited and revengeful over the lack of adjustment; but as soon as pupils have difficulty in behaving becomingly or properly, the scene generally changes from diagnostic and judicious treatment to one characterized by revenge and punishment. For some unknown reason, school administrators and teachers believe pupils should know how to control themselves, how to be polite, how to respect authority. Alas, these controls are not inherited or passed out as gifts from heaven any more than are abilities to speak French and to solve quadratic equations. Read from the two investigations immediately following and draw a few conclusions from the findings reported.

Wickman compared the attitudes of 511 teachers and 30 mental hygienists (clinicians) with reference to the relative seriousness of behavior problems in school children.[2] The teachers' attitudes toward behavior problems were, in general, as follows:

MOST SERIOUS		LEAST SERIOUS	
Immoralities Dishonesties Transgressions against authority	*Violations of:* Orderliness in classroom Applications to school work	Extravagant, aggressive personality and behavior traits	Withdrawing, recessive personality and behavior traits

[2] E. K. Wickman, *Children's Behavior and Teachers' Attitudes* (New York: Commonwealth Fund, 1932), p. 130.

The mental hygienists' attitudes were in substance:

MOST SERIOUS		LEAST SERIOUS	
Withdrawing, recessive personality and behavior traits	Dishonesties Cruelty Temper tantrums Truancy	Immoralities Violations of school-work requirements Extravagant behavior traits	Transgressions against authority Violations of orderliness in class

In comparing the teachers' ratings with the ratings of clinicians, the most salient finding is the complete reversal in estimating the seriousness of problems describing the withdrawing, recessive personality and behavior traits. Whereas teachers considered shyness, sensitiveness, unsocialness, fearfulness, dreaminess among the least serious of all problems, the clinicians ranked them together with unhappiness, depression and easily discouraged, resentfulness, physical coward, suggestible, and overcritical, at the very top of the list as the most serious problems. These items in the mental hygienists' ratings completely replace the problems relating to sex, dishonesty, and disobedience which the teachers ranked as most serious.[3]

Garinger secured replies to a questionnaire from 312 high-school principals in forty-seven different states concerning the administration of discipline in their schools. A quotation will give information about principals' attitudes toward the seriousness of school offenses:

Of all offenses theft was considered the most serious. The index for this trait is 2.70 and stands by itself far above any other. Next below theft is a group of traits with approximately the same index value. For the most part, these items represent either offenses against the authority of the school, a thwarting of the will of the principal and teacher, or else a violation of the moralities. They represent an attack on the established order. They upset regular school routine. In this group are the problems of truancy, impertinence, or defiance of the teacher, cheating on tests, forging excuses, obscenity, and gambling.

Problems that indicate a lack of personal adjustment such as lying about others, inattention in class, giggling in class, carelessness in work—behavior traits that are usually symptoms of maladjustment that may lead to serious disabling habits and attitudes—are given a place much below those traits that challenge ordinary school routine. Although the inquiry explicitly denoted that an estimate was desired of the seriousness of the problem for the future adjustment of the pupil, the answers indicate that the teacher and the school routine were of primary concern. Wickman found a similar attitude. Teachers and principals are inclined to think in terms of their

[3] *Ibid.*, p. 126.

own welfare and that of the regular routine. Docility, obedience, conformity, are prize objectives. They become ends in themselves; and infractions of the rules of the school or of the moral code are treated not as symptoms of maladjustment whose cause is to be found but as an offense to be punished.[4]

Better behavior an objective.—Discipline too long has been considered only a necessary force to keep conduct within reasonable bounds so that book-learning could go forward. Within recent decades a new emphasis upon changes in conduct as objectives has emerged, and the removal of any undesirable personality or behavior traits is held to be as worthy an objective of education as the elimination of illiteracy or the eradication of diseases.

Although the recessive and withdrawing traits do not interfere with order and decorum in the classroom, these characteristics do denote, mentally, cancerous growths that sap the mind of ease, happiness, and contentment. Bashfulness and shyness should be viewed as deep-seated troubles, and both need to be diagnosed and remedied many times more conscientiously than are the purely academic difficulties. Surely the rebuffs, sorrows, failures, and bitter experiences of life, within and without the school, have sunk deep into the hearts and minds of some pupils, and the high-school principals and teachers must assume great responsibility in bringing the emotionally sick individuals back to normalcy. If the school neglects this objective, what social agency will or can do very much about it? What other social institution has the resources and personnel to give the assistance?

Causes of poor adjustment complicated.—The school is not, however, wholly responsible for the causes of poor adjustment or wholly responsible for the correction of poor adjustment. Testimony of truant officers shows that causes do lie elsewhere. For example:

Two junior high school boys were chronic truants. One night six hams and a sack of flour were stolen from the corner grocery store. A hole in the

[4] E. H. Garinger, *The Administration of Discipline in the High School* ("Teachers College Publications," No. 686 [New York: Columbia University Press, 1936]), p. 9.

flour sack enabled the truant officer to follow a little white line of evidence to a certain home, and it was in this home that the two truants lived. The odor from some kind of meat was followed to the source, and on the kitchen stove was a ham in the kettle—the mother was evidently getting one ham ready for consumption. Securing permission, the officer went into the basement, and there were found the other five hams and the sack of flour. Further questioning brought out the fact that the boys brought the hams and flour home on the preceding night. The mother was interested in cooking the hams, not in discovering where they were secured, or how. Father worked during the day, and slept eleven or twelve hours every night. Each boy had a key to the back door, and the parents were always asleep when the boys came home. Where the boys spent their evenings did not bother the mother, and the father frankly admitted that he couldn't handle the boys. The mother thought the boys were in school during the day; at least, they were not at home.

Truancy and dishonesty have their causes in out-of-school as well as in-school sources. Lying, cheating, profanity, impudence, disobedience, fearfulness, unsocialness, and other forms of misconduct or maladjustment have their causes in the home, the gang, the associates, the reading material, the movies, the school, and the community.

The high school and correction.—Correction should begin at the sources of poor adjustment, but if the sources lie outside the jurisdiction of the school, then much that the school attempts in the way of correction is neutralized because there are limits beyond which school influences cannot be exerted effectively, if at all. However, opportunities of various kinds to influence conduct positively can be afforded by secondary schools. The program of studies can be enlarged to provide subjects and courses more in keeping with the needs and aspirations of youth. Provisions for individual differences in abilities and interests are always in order. More can be done in the way of enriching social life by introducing clubs, extracurricular activities of various kinds, school dances and social gatherings, school assemblies, and intramural sports and games. A guidance program can have for one objective the gathering of information about pupils and the utilization of this information in helping the pupils meet their problems and tribulations. A philosophy of education can be promoted which stresses more the part education should play in

making the school a better place in which to live as well as a place in which to learn. The development of the whole child should hold a prominent place in the philosophy promoted. Education must include more than just learning from books.

The teacher and correction.—By far the greatest responsibility for better behavior in secondary schools will be assumed by teachers. Further discussion of a teacher's particular part in creating an ideal environment for learning, especially the learning of proper conduct, follows.

1. *Philosophy of correction.*—Already much philosophy has been stressed, but for emphasis it can be stated again that correction is a part of teaching which is focused upon the more personal phases of pupil development. Diagnostic and remedial measures, essential in promoting educational progress in the commonly understood sense, should be applied to the learning of behavior. Changes needed to meet social situations are as necessary as changes required to meet mathematical, scientific, literary, historical, economic, political, and vocational conditions. In short, the philosophy of correction should be broad enough to include the proper adjustment of pupils to themselves and to society as an objective most worth while.

2. *Provisions for individual differences.*—Just where prevention stops and correction begins cannot be definitely indicated, and in providing for differences no line of separation can be drawn. If a pupil meets with constant failure, he is bound to become a problem, either as an obstreperous offender or as a defeated and recessive individual. Bright pupils probably have excess energy to spend in disturbing the teacher and their classmates. Lack of provisions for differences, then, becomes a cause of poor adjustment, and adequate means of meeting differences becomes the correction.

3. *Teaching.*—Poor teaching may be responsible for misbehavior, while good teaching may be prevention or correction, or both. The teaching meant here as corrective in nature is instruction characterized by an environment in which there are participation, helpful and sympathetic assistance, motivation, enjoyable and profitable experiences, respect for individual abilities,

encouragement, opportunities for success, and congenial working relationships. In this environment the classroom becomes a place to work under the guidance of a patient and sympathetic teacher.

4. *Personality.*—An examination of the preventive and corrective practices for maintaining ideal social conditions shows unmistakably that the teacher is one important factor. "As is the teacher, so is the school" is an old saying that still holds with complete vigor in educational practice. What a teacher is and what she does make for good or poor discipline. The personality of the teacher does influence her effectiveness. Under the influence of one teacher pupils will act negatively, while these same pupils will respond positively when a different teacher instructs them. Some persons maintain that pupils should be trained to learn without consideration of the teacher, but until the nature of pupils in our secondary schools changes and until pupils learn without reference to influences in the environment, the teacher will be a decisive factor. Keeping order in a classroom is a real problem, not an imaginary or theoretical one.

What are the traits generally selected as important in a good teaching personality? One cannot build an effective personality until he understands the traits and their effect upon pupils. Investigations show that these traits seem to be prominent in teachers who have good control over pupils: enthusiasm, forcefulness, cheerfulness, physical alertness, mental alertness, kindness, patience, fairness, decisiveness, and a sense of humor. Now picture a teacher who is spiritless, timid, sad, physically inactive, mentally sluggish, cruel, easily disturbed, partial, and stoic. Under which influences would pupils be inclined to react negatively?

Barr found certain elements of personality strikingly different in his study of good and poor teachers:

> From the evidence at hand, it seems that when judged by personal appearance, personal charm, and attractiveness, poor teachers have the advantage over good teachers. Good teachers, however, showed marked superiority in physical vigor and in enthusiasm; many poor teachers showed an absence of these qualities. Very few writers have placed sufficient emphasis upon energy, vitality, and alertness as prerequisites to teaching

success. Good teachers showed superior self-control (this was to be expected), less reserve, and greater earnestness. There was really a marked difference in the amount of self-control shown by good teachers when compared with poor teachers. Good teachers were much more appreciative, more sympathetic, and much pleasanter, on the whole, than poor teachers. In this connection, as has already been noted, good teachers were in the habit of nodding appreciatively, commenting favorably, and smiling as they worked with their pupils in the classroom. So marked is this practice among good teachers and so noticeably absent among poor teachers that it is almost possible to judge the quality of teaching by the number of nods and smiles distributed about the classroom during a certain period. Good teachers also usually possessed a better speaking voice and a keener sense of humor than poor teachers. Poor teachers seem to be utterly devoid of a sense of humor. Finally, poor teachers possessed, besides these positive qualities, a number of negative attributes not found among good teachers; some were sarcastic, some dictatorial, and others indifferent.[5]

Teachers often consider pupils as so many objects without feelings or human inclinations; on the contrary, pupils are human beings with all the sensitivities of human beings, and the teacher who is able to stroke human nature in the right way secures the co-operation and the best work and the best conduct from pupils. The human element in the teaching and learning situation cannot be set aside as unimportant and superficial. The teacher who would succeed cannot neglect that phase of instruction which helps bring about the proper social environment through the influence of her own personality in the classroom.

5. *Punishment.*—A discussion of corrective measures must eventually lead to punishment, because some infractions upset the environment so much that immediate treatment of offenders is obligatory. Punishment, however, should be in keeping with the suggestions for correction heretofore enumerated regardless of the character of the offense.

The question might be asked: "Is punishment necessary?" Answers will show wide difference of opinion. At the extremes are persons who do not believe in punishment and those who voice emphatically their belief in stern rule if necessary. Then

[5] A. S. Barr, *Characteristic Differences in the Teaching Performance of Good and Poor Teachers of the Social Studies* (Bloomington, Ill.: Public School Publishing Co., 1929), pp. 72–75.

there are those who follow a course somewhere between the extremes.

There is no easy solution to the problem of adjustment procedures. Some misconduct such as inattention, truancy, laziness, and dishonesty show serious defects of personality or deep personal troubles, and correction for these forms of behavior requires treatment of a delicate nature with emphasis upon underlying causes and preventive conditions. On the other hand, it seems reasonable to maintain that such offenses as haughty impudence, open disobedience, raucous defiance, wilful destruction of property, and deliberate disorderliness in class must be handled immediately and emphatically. Some acts against society, including society in the classroom, cannot be tolerated. If society outside the classroom will not tolerate certain acts, then it is not right to allow pupils to learn that they can "get away" with these acts in the classroom, thereby giving pupils the wrong notions of life. A teacher cannot wait for the psychiatrist or mental hygienist to investigate the causes prompting a pupil to be downright impudent and disobedient and to make an angel out of him before she takes a hand in the matter. There is quick reaction in life if one calls another a liar or insults him. The act in itself is beyond toleration regardless of possible causes. Some classroom misconduct must be nipped quickly, surely, and consistently. There is no alternative if the proper social conditions for learning are to be preserved. Diagnostic and remedial work will follow, of course, but intolerable acts must be recognized and some kind of correction initiated immediately.

Garinger gives a list of disciplinary measures employed and the percentage of school officials who use them.[6] He includes the assistant principal, dean of girls, home-room teacher, counselor, and visiting teacher, in addition to the principal and classroom teacher among officials, but only the last two are included here (Table 2).

An examination of the devices used by teachers shows a strong tendency toward punishment in the forms of sending pupil to the

[6] *Op. cit.*, p. 27.

principal, detention after school, special tasks, and "bawling out." Garinger's conclusion that "infractions of the rules of the school or of the moral code are treated not as symptoms of maladjustment whose cause is to be found but as an offense to be punished" seems to be well founded.

Correction in too many cases becomes the habit of prescribing a few stereotyped punishments for all offenses. Sending to the office and detention after school are easy ways to relieve the

TABLE 2

PERCENTAGE DISTRIBUTION OF OFFICIALS WHO EMPLOY EACH OF THE DEVICES

Disciplinary Measures Employed	Principal	Classroom Teacher
Detention after school	34.9	73.7
Requiring parents to come to school	85.9	11.2
Sending pupil to office	11.8	86.2
Withdrawal of privileges	75.6	24.6
Reprimand—"good bawling out"	57.0	49.3
Suspension of individual	85.8	0.0
Special tasks	29.8	53.5
Demanding an apology	39.1	32.3
Forcing pupil to drop course	53.2	12.1
Expulsion	39.4	0.0
Giving of demerits	9.9	13.7
Lowering mark of pupil	4.1	29.4
Imposition of a fine	18.5	7.6
Corporal punishment	21.7	3.8
Group suspension	11.5	0.6

teacher of responsibility, easy ways to pass over the causes, easy ways to avoid thinking out corrective measures. While the methods of correction mentioned may be appropriate at times, they surely are not blanket cures for all poor adjustments. A conference for "bawling-out" purposes is much easier than a conference designed to get at the causes. It is easier to make a pupil drop the course than it is to make the course worth while, provide for individual differences in the course, and teach the course effectively. It is easier to lower the mark of a pupil than it is to diagnose the causes of indifference, inattention, and lack of industry. In short, it is easier to do the ineffective thing than it is to accomplish the worth-while thing.

Conclusions.—(1) Securing of the proper physical and social environment conducive to learning is a principle of teaching. (2) The environment in which pupils live and learn has a strong influence upon living and learning. (3) Individuals having trouble in adjusting themselves to an ideal social environment need careful guidance and intelligent assistance in learning to adjust. (4) All factors which interfere with an individual's adjustment should be removed. (5) Disturbing factors which lie within pupils should be corrected so that pupils can control themselves and aid in the building of an ideal school environment. (6) Corrective devices and procedures should have as their aim the improvement of pupils' ability to live in a co-operative society.

APPLICATION EXERCISES

1. A teacher in Illinois was charged by parents with cruel treatment of their son, John, and they wanted the teacher discharged. Complaints had come to the teacher from boys and girls who had been kicked on the shins by John. Being on the alert, the teacher saw John perform in the schoolyard and in the hall, so she was sure of the facts. She had John stand with his back against the wall of the classroom, and then asked if anybody had been kicked by John. About a dozen pupils said they had. She then had those who had been kicked walk by John, and, as they did so, each one kicked John lightly on the shins. The case was brought before the school board. The board members examined John's shins. Pupils involved in the case were there, as well as the teacher and the parents. Evaluate the case from the standpoint of principles of correction. How would you have decided if you had been a member of the board?
2. Intent makes a difference in the punishment of wrongdoers in court cases. Just how should intent make a difference in school correction? Give several illustrations.
3. Keeping a pupil after school and making him memorize poetry is sometimes used as a corrective measure. Evaluate this form of correction.
4. Why are sarcasm, ridicule, irony, and other kinds of piercing remarks considered undesirable devices?
5. Enumerate some disciplinary measures your teachers employed which were really effective in correcting your misbehavior.
6. Do you think a teacher is sometimes justified in sending a pupil to the principal? Give a few illustrations.
7. Which of your teachers always had well-behaved classes? Can you tell why?

8. Should there be any difference in the treatment of a boy who is inattentive and one who is impertinent? How would you proceed to secure proper adjustment in each instance?
9. A college-town high school has an enrolment composed almost entirely of the children of college faculty members. Another high school is in a town where the enrolment is composed of the children of miners. From the discipline standpoint, where would you rather teach? Why?
10. What is meant by the principle of correction which states that there should be a definite relation between the misconduct and the correction? Illustrate.
11. What situations in school provoke pupils to cause disturbances? How could these situations be prevented?
12. Miss Blank had a rule that any person causing a disturbance in her class would be kept after school. One day a serious disturbance occurred in the back of the room where three or four boys were seated. The teacher did not know exactly which boy or boys caused the trouble, but she thought she had the offender. She called Harry to the front of the room, spoke to him angrily, and told him that he would make up time after school. Harry meekly insisted that he was not the one who caused the disturbance. The teacher said, "It's just natural for you to lie; for this I shall keep you after school every day for the remainder of the week." Extract from the foregoing incident principles of prevention and correction fulfilled or violated.

RELATED READINGS

Bossing, N. L. *Teaching in Secondary Schools,* chap. xx. 3d ed. Boston: Houghton Mifflin Co., 1952.

Goetting, M. L. *Teaching in Secondary Schools,* chap. iii. New York: Prentice-Hall, Inc., 1942.

Risk, T. M. *Principles and Practices of Teaching in Secondary Schools,* chap. xxix. 2d ed. New York: American Book Co., 1947.

Rivlin, H. N. *Teaching Adolescents in Secondary Schools,* chap. xii. New York: Appleton-Century-Crofts, Inc., 1948.

Schorling, Raleigh. *Student Teaching,* chap. iv. Rev. ed. New York: McGraw-Hill Book Co., 1949.

Sheviakov, G. V., and Redl, Fritz. *Discipline for Today's Children and Youth.* Washington, D.C.: Department of Supervision and Curriculum Development, National Education Association, 1944.

Stiles, L. J., and Dorsey, M. F. *Democratic Teaching in Secondary Schools,* chap. xi. Chicago: J. B. Lippincott Co., 1950.

Williamson, E. G. *Counseling and Discipline.* New York: McGraw-Hill Book Co., 1949.

Wofford, K. V. *Teaching in Small Schools,* chap. vii. New York: Macmillan Co., 1946.

INTRODUCTION

PART V contains four chapters which relate, for the most part, to final instructional activities. Drill, review, pupil participation in teaching, radio, television, social dynamics, measurement, and instructional planning have more meaning if they are studied in relation to the eight principles of teaching. Very often phases of classroom work, such as the review and measurement, are considered dissociated from instruction and are performed either as mere repetition of previously learned associations or as means to secure marks or ratings. Phases of classroom instruction, often reduced to mechanical manipulation, have real possibilities as aids in teaching out the principles.

CHAPTER XVI

DRILL, REVIEW, PUPIL PARTICIPATION IN TEACHING, AND RADIO AND TELEVISION IN CLASSROOM INSTRUCTION

SOME persons maintain that the recitation is passing, that the traditional class with the teacher as the questioner and the pupil as the quizzed must give way to something better, that educational procedures in general ought to be revised and improved, or scrapped. Others believe in pure individual instruction with no class recitation whatsoever. Still others stand for free class meetings of the highly socialized type in which pupils carry on the work just as adults do in group meetings. In the midst of the controversy a teacher may be confused and bewildered. What should she do? The only course to follow is to examine the aims and the learning process and then to plan classroom procedures which unite aims and processes most effectively. Of course, the selection of valuable aims and a thorough knowledge of the learning process are basic. The foregoing is written to prepare the ground for this chapter, because the teaching to be considered may border upon the oft-criticized recitation method. The purpose of using class time is to produce desirable results, and, if these results can be produced most effectively by directing learning in a certain way, one need not be frightened by the name given to the procedure.

DRILL

In a drill a conscientious effort is made to plan and regulate activities so that classroom work may contribute directly to more learning than can be or will be realized by pupils during individual study. Drill, as meant here, is not the testing of results but the strengthening of learning. After the assignment, questioning, and self-directed study, the learning may need further strengthening by teacher-initiated and teacher-directed classroom exercise. A few illustrations will bring out the nature of objectives

which need further inculcation during class time. The teacher of a foreign language is necessarily concerned with correct pronunciation, correct constructions, accurate conjugations, correct spelling, fluent oral reading, understanding of the language when spoken, and good translations. To secure these, she must rely upon directed performance during a part of the period. Other illustrations are found in those fields requiring individual or group overt action, as in public speaking, dramatics, games, instrumental and vocal music, typing, and stenography. The strengthening in all these illustrations is brought about by drill. In these examples teaching is primarily centered upon the right kind of growth, and the development is to take place during regular class time and under the direct influence and guidance of the teacher. Pupils may continue to strengthen associations at other times, but some of their time is spent under supervised drill.

A foundation necessary.—Strengthening cannot go on without initial learning or without something already learned to be strengthened; hence, the initial responsibility in teaching is the building-up of learning to a point where drill resumes the activity necessary for final and satisfactory acquisition. Final and satisfactory acquisition is that degree of learning in which the associations have reached the standard desired by the instructor. Too often drill is depended upon, in itself, to give mind-set, meaning, and the right process. Care should be exercised in preparation of the background or foundation, otherwise drill cannot and does not function efficiently. A pupil may use the wrong process, memorize without knowing meanings, imitate blindly, or see or feel no reason for his practice. Now, before the stamping-in process aimed at in drill is begun, the needed amount of development should be completed. Many of the ideas already discussed in sensory-experience, problem-solving, and appreciation types of learning can be brought into operation in building up a foundation.

Conducting drill.—When the foundation has been completed, activities for further strengthening through drill should be carefully planned. No one device will satisfy in every instance, be-

cause the responses are different in the various subjects. There is, however, one criterion of good procedure which holds in all drill: *The extent to which a pupil participates actively and continuously will determine his progress.* In this criterion can be seen two elements: active participation and continuous participation. Many drill lessons are inefficient, because only a few pupils participate, and they do not participate continuously. It is not uncommon to find a spelling or vocabulary drill taking the form of a contest in which the last one remaining is declared the winner. What benefit comes to the first ones who are eliminated and then dream until the winner is finally discovered? Do these pupils profit? A conscientious pupil may follow every step during the contest and benefit thereby, but, if he does, it is not the contest itself which pulls him into profitable activity. There are too few of the conscientious pupils to recommend this procedure. Furthermore, contests generally are beneficial only to the extent of drill previously done, probably individually and outside of class time, for the activity during the contest is chiefly a test, not a class-learning exercise. Probably an ideal drill is typing, because in this drill every pupil has a machine and drills actively and continuously and in keeping with individual ability during the drill period. Similar examples of continuous drills are those found in physical education, singing, orchestra, band, shop, and domestic art. The nature of the drill in these cases is such that no great difficulty is found in keeping every pupil working actively and continuously.

Conducting profitable drill in the so-called academic subjects, such as mathematics, English, foreign languages, science, and history, is not so easily done. There must be, nevertheless, an endeavor to have active and continuous participation by every class member. Let us suppose that the drill is intended to strengthen the associations between words and their meanings in a foreign language, to strengthen correct grammatical expression, or to strengthen mathematical operations of a mechanical nature. So frequently drill is carried on by each pupil taking an exercise, a sentence, or a word in turn, and then is left out until his turn comes again. In this kind of drill only one pupil at a

certain time is active; the others attend just sufficiently so as not to be caught unaware when their turns come. An improvement upon this kind of drill can be made by planning and regulating drill exercises so that all pupils are active at all times and upon all items. By mimeographing drill lessons, and placing a copy in the possession of each pupil, an opportunity is afforded each pupil to work continuously and at his own rate. A page with the one hundred combinations in addition thereon is a good example of material appropriate for drill in the combinations. Many good drills which can be purchased in printed form answer the same needs as mimeographed drills. An inventive teacher can use the blackboard to good advantage if other means of presenting drill in a complete and individual form are not obtainable. Dictation drills also serve well. The drills thus far enumerated require written responses from every pupil, and thereby bring into operation the principle of self-activity in giving responses. There is a vital difference between listening to responses made by others and actually making the responses one's self; and in the foregoing drills every pupil must make an individual and internal reaction, because the nature of the drill exerts constant pressure upon all those being drilled. What an individual does for and by himself counts in strengthening learning, not what he listens to passively when it is done by others. Furthermore, the correcting of these drill materials, if done by the pupils themselves in class or by the teacher outside class, shows the mistakes made; and, when pupils know their specific errors, they can remedy them by knowing just where to center their attacks. Much of the effectiveness of individual drill is found in the focusing of attention upon one's specific errors, not in a general attack upon a wide range of materials. Another point to keep in mind is that pupils will and should drill themselves, and the drills so far discussed are very useful in making pupils aware of their weaknesses, thereby making their individual drill outside class or during directed study more pointed and corrective.

Some academic aims cannot take the form of written responses, such as correct pronunciation in languages, voice variations in dramatics, and oral reading. Even some responses that could be

written can probably be more quickly and profitably strengthened by verbal reproductions, as in giving conjugations of verbs or in giving rules. Even in these or similar instances, only one pupil at a time can make the responses unless we include the singsong concert responses of a group acting collectively, a practice not to be recommended. Under the condition of one pupil making a verbal response, some procedures to keep all pupils as active as possible in the role of listeners but silent participating followers need to be devised. Effective procedures in verbal drill must necessarily arise in the teacher's personal conduct of the drill; in short, one must look to the teacher as the source of power, making for efficient and continuous reactions from pupils. Unless the conduct of the drill be such that continuous reacting by each pupil is required, the drill loses its stimulation and reaction-producing possibilities. It must be repeated again that the way and the extent to which a pupil uses his mind are determined largely by the teacher. For example, if an inactive teacher gives verbal vocabulary drill in French, drawls out a pupil's name (the first one in alphabetical order), asks him to give the meaning of *beaucoup,* records his grade, and then proceeds to the pupil coming next in alphabetical order, and continues in like manner until the last word is reached, one can detect and feel the inadequacy of the drill; and that inadequacy arises because the teacher lacks in personal power or conducts drill in a routine and stilted fashion.

A few suggestions at this time will denote the factors needed to make verbal drill exercises productive of maximum results:

1. The teacher sets the pace.
2. Be dynamic and enthusiastic and alert; drills should be opportunities, not dreary performances.
3. Keep pupils in suspense by avoiding alphabetic or row predetermined order in calling for responses.
4. Keep every pupil following by holding him responsible for mistakes and omissions made by other pupils.
5. Inject a little humor, praise, or stimulation occasionally.
6. Give every pupil a short opportunity to make responses rather than giving prolonged opportunities to a few.
7. Avoid recording grades or doing extraneous tasks which slow up the work and make pupils nervous.

8. Call upon any pupil to continue at any time or place as the drill continues.
9. Maximum exertion from pupils throughout a short period is better than half-exertion during a long period.
10. Give time for reflection and recall when dealing with materials demanding these mental operations.

Other considerations.—A few other general ideas to be kept in mind and put into operation while conducting drills are:

1. Motivate drill.
2. Give pupils standards of good attainment so that the learners may have ends toward which to work and by which they can judge the degree of attainment. Accuracy, speed, quality, and quantity are factors in standards.
3. While drill is in progress or after it is completed, diagnose results, discover places needing more emphasis, and plan remedial drill either in class or for individual strengthening outside class.
4. Encourage pupils to drill themselves during directed study or out-of-class hours.
5. Teach pupils how to strengthen their own associations, mental and physical, during out-of-class time.
6. Give previous notice of drill and standards to be attained in the assignment, thus insuring individual application before class drill.
7. Avoid all irrelevant activity during drill, thereby securing maximum training in the actual learning itself during a specified time. Writing down long addition problems is not valuable in the least; it is the mental operations in adding that are valuable. If possible, avoid all needless writing and copying. Provide everything possible in prepared form so that the operation to be strengthened is the only one exercised.
8. In so far as possible, have drill carried on under the same conditions and circumstances in which it will be used in life-situations. There is the pathetic story of a boy who was kept after school to write the principal parts of the verb *go* one hundred times. When completed, the teacher was not around, so he left a note for her stating: "Teacher, I have finished and have went home." The pupil thought of this punitive drill as a forced exercise in penmanship or in counting to one hundred, not as a thoughtful process in meeting a real situation by carefully chosen words.

REVIEW

Common purpose of reviews.—The mental process of "going over" material already studied is ordinarily called "review." Frequently review is repetition in the strictest sense of the word;

aims and learning activities are precisely the same as they were in original learning, merely the retracing of steps. Repetition of items, lessons, and chapter contents already studied is the common interpretation given to review. The memory and motor types of learning are the two brought into operation during reviews as ordinarily conducted. Many reviews are in reality drill or recall exercises. At any rate, recall of materials to produce better retention is one purpose of reviews.

Main purposes of reviews.—A review should be a learning activity with more involved than drill or recall. It should lead to some further understanding of a division or unit of a field of knowledge, or the development growing out of several divisions or units in a field or the field itself. This interpretation seems justified, because a review should come when there is something significant enough to be reviewed. With the accumulation of facts and information and partial understandings gained by daily study, a basis exists for new organization, different relationships, and causal developments that could not be discovered in the early or earlier stages of study. The mind should be constantly revising and reorganizing, and, the more there is in mind, the deeper and broader become the revision and the reorganization. A general purpose of reviews is to foster the use of causes, effects, and relationships in attaining more continuity and better understanding, and this continuity and understanding should encompass not only a division or unit but, whenever possible, several units in a field or the whole field.

Exercises to illustrate purposes of reviews.—Suppose you are now in a class in college and you recall that the instructor had you review the third chapter of this book ("The Objectives Should Be Most Worth While") after you had finished the chapter some time ago. Review at that time would have included only the contents of the chapter with very little additional in the way of causes and effects, relationships, and understandings. Suppose, in order to bring out some application on your part, he had given a problem requiring more than mere memorization of the contents in the review. The problem might have been: "If you were teaching forty pupils in the Blankville High School, what

bearing upon your teaching would objectives have?" You would have said something about new demands in our society, traditional subject matter, useful objectives, skills, appreciations, understandings, and ideals. You would have re-read the criticisms of our high schools in the excerpts from the article written by the young ex-marine. You would have mentioned that one principle of teaching was to select most worth-while objectives, because pupils were not able to do it for themselves. The review, in this instance, was limited to a definite portion or unit of the subject field. A second purpose of review is to bring out more meaning in a division or unit of a subject field.

Let us suppose now that he has you review at the present stage of your learning. You will immediately realize that the scope of the review is much larger—in fact, the scope is the field so far studied. The difference in scope, then, makes a difference in the kind of review. If a review is a learning activity in the sense that more is involved than repetition of past acquisitions, then this statement holds more significance in your second review than in your first, because more opportunities exist for learning. If you start reviewing without any suggestions or problems as guides, you will probably realize the causal relationships between objectives and types of learning, between types of learning and self-activity, between types and individual differences, between objectives and release of energy, etc. If the instructor plans for the review as he does for any other important class undertaking, he will guide the review by thought questions and problems so as to bring out significant relationships and deeper understandings. He may give a problem such as:

> If you are teaching a class of forty pupils in the Blankville High School, what principles will you fulfil in teaching and what means will you use to fulfil these principles?

Questions such as these would assist you in making a good review:

1. What principles can be fulfilled in part or in whole through the assignment?
2. What effects upon the release of energy do the other principles have?

3. Inadequate fulfilment of which principles is probably responsible for the lack of understanding?
4. How would you apply the principles in teaching "Thanatopsis" or the three laws of levers?

The second review shows how understanding is increased by discovering and utilizing new causes, effects, and relationships. Unification is increased and intensified through proper review. These additions to learning are possible in the second review because there is a more abundant background of information and knowledge. The third purpose of a review is to increase understanding through causal development encompassing several units in a field or the whole field.

Planning reviews.—Reviews should be considered as carefully as are other procedures in teaching. Assignments, questions, socialized recitations, directed study periods, and inductive lessons are discussed and treated as important; but, too often, reviews are considered as routine in a teacher's work. Merely announcing a day for review is frequently all that is done. Reviews should be vitalized. Several ways of vitalizing them are proposed.

1. *Time for reviews.*—As explained heretofore, directed study should come at a psychological time, and the same criterion should guide the time for reviews. Learning should control the time. Whenever aims in the nature of more involved relationships, new viewpoints, deeper understanding, and more significant unification are necessary in learning, the right opportunity for a review has come.

2. *Preparation for review.*—The same preparatory steps taken in making an assignment apply to the review. Approach, motivation, objectives, and direction of study are essential. Some extra stress should be placed upon objectives and study activities, because these two are especially important in reviews. As the objectives are extended interpretations growing out of relationships not seen or vaguely seen before, the objectives must be set forth carefully. Direction of study is also necessary. Questions and problems of the proper kind assist in giving pupils a notion of the aims and study activities. Examples:

Did problems similar to this one ever arise before? In what connections?

Compare and contrast the conditions and problems of the laboring class during the period of the Industrial Revolution with the conditions and problems during the handicraft stage.

Be able to trace the developments that lead up to the Kansas-Nebraska Bill of 1854.

3. *Conducting the review.*—Conducting a review proficiently is no easy task, and it is one phase of teaching in which the instructor should not depend upon a pupil chairman to carry forward, yet very often it is during a review that responsibility is shifted to pupils. Diagnosis, evaluation, development, emphasis, and remedial teaching should be at their highest levels during a review in class. The final clinching of important aims is done at this time. The impressions left from reviews should be correct and lasting. In short, conducting a review as it should be done requires teaching of the highest quality.

Reviews and learning.—Reviews are generally thought of in connection with "going over" the materials for the purpose of increasing retention. Although increasing retention is one purpose, it is not the most important. Reviews should be considered as learning exercises, and learning should denote not only the improvement of retention but also the attainment of those aims emphasized under the second and third purposes of reviews. Reviews which become drill exercises are actually drill lessons and not reviews.

The reviewing activity in learning is a continuous process. To think of reviews as weekly or monthly opportunities "to brush up" on memorized materials is illogical. Pupils should be taught to relate present study with past events or knowledge in their daily preparation. Only when special emphasis and time center upon the study of previously covered materials for the purpose of deeper interpretations and more significant meanings and greater unification should the review be considered separate from everyday study and preparation.

PUPIL PARTICIPATION IN TEACHING

Practically all teaching has pupil participation in the way of answers to questions and contributions in discussions, but these

are thought of as regular parts of socialized recitations and developmental phases of classroom work. Sometimes pupil participation becomes so closely allied with teaching that the participation becomes, in reality, teaching.

A pupil who gives an oral report first studies some topic or problem individually. His activity in securing the information is a part of learning; but, when the pupil has thirty or forty of his classmates giving their time and energy listening to his report, he is carrying on actual classroom teaching. He is participating in teaching. A real difference exists between participation in learning and participation in teaching. Teachers often justify participation in teaching on the ground that the pupil is gaining confidence in speaking before a group or is learning to pronounce his words more distinctly. However, forty pupils should not waste their time while one pupil learns. Pupils who take over teaching responsibilities should teach. More attention should be given to this whole problem of pupil participation in teaching.

1. *Oral reports.*—One form of participation in teaching is the giving of oral reports. Although not ordinarily thought of as actual teaching, the giving of reports is teaching. Others in the class are listeners; they are the learners. If the others are to learn by listening, then, in the giving of reports, principles of learning must be employed just as truly as if the teacher directed the learning. Among the principles are these:

1. The learners should feel a need for the particular message, that is, a mind-set is necessary.
2. The report should supply facts and information which fit in with the topic under class discussion.
3. The report should convey ideas quite easily assimilated because during the report there is no time for reasoning by class members. Listeners are forced to learn rapidly. The reporter may have spent hours in understanding the ideas presented, and listeners cannot be expected to understand the ideas in a few minutes.
4. Materials in reports should include interesting and somewhat narrative aspects of a subject. Stories, events, sidelights, personal incidents, and biographical additions are readily assimilated and retained, and they make desirable materials for reports. Technical phases of a subject should not be included in reports.
5. The teacher should make certain that the pupil reporting has the

proper content in the report. Often pupils ramble on and on and never get to the essence of the topic assigned.

6. Reports should be well prepared so that the essentials are presented logically.
7. The pupil should do his best as a speaker. Forcing pupils to listen to a poor speaker is not altogether right. Listeners may be quiet in a conduct sense, and they may be quiet in a mental sense also.

2. *Discussion leaders.*—Recently the author visited a class conducted by a discussion leader. The teacher sat in the back of the room and was a silent partner; the discussion leader, a pupil, asked the questions and carried forth the teaching. Once during the period the teacher said to the leader, "Paul, you are not developing that at all satisfactorily; see whether you can do better." An inquiry after class revealed what the teacher believed vital in teaching. She said, "Every day I appoint someone to act as leader for the next day. I think it is splendid training for the pupils. It makes them feel responsible for their own education. It really shifts activity over to them." During the period the leader conducted the history class on a purely textbook-recitation basis. He had a long list of questions based on the text and had the answers briefly written out.

Obviously, pupils cannot be expected to take over instruction obligations and fulfil them satisfactorily. One would not expect a boy in junior high school to perform surgical operations and do expert work just because the self-activity in performing operations was shifted to him. More than self-activity is at stake. Going through the motions does not necessarily mean that the pupil leader is profiting or that other pupils are gaining in accordance with their capacities. Self-activity may be the wrong kind, or it may be operating at a low level. Principles of teaching are based upon understandings and interpretations and applications which tax the mature and specially trained individual, and the wholesale shifting of teaching to pupils is placing responsibility upon shoulders unable to carry it.

3. *Parliamentary procedures.*—Very similar to the discussion-leader plan are those procedures based upon parliamentary practices. The parliamentary procedure is a little more formal, in that officers are elected; the president conducts and the secretary

records; pupils address the president and the president recognizes the pupils. In public speaking classes one or two critics are also elected. Officers are elected at stated times so as to give all members an opportunity to participate in an official way during a semester or a year.

Certain activities can be performed as well by the pupils as by the teacher. Calling upon pupils to give their speeches, reading the minutes and announcements, electing officers, etc., are examples of activities readily performed by pupils. However, public speaking as a course or part of the English work involves objectives, organization, types of learning, motivation, individual differences, diagnosis, and remedial measures. Proper guidance and direction of these should not be delegated indiscriminately to pupils. Pupils would not be taking public speaking, or any other subject, if they knew all about it; hence, no more should be shifted to the pupils than they are able to do, with their limited qualifications.

In conclusion, then, it can be stated that, in all forms of pupil participation in teaching, the teacher should not lightly and thoughtlessly shift to the pupils the responsibility of teaching. Pupils are not teachers; they are learners, and they cannot teach without first learning what to teach and how to teach.

RADIO AND TELEVISION IN CLASSROOM INSTRUCTION

A perusal of means in teaching will reveal that many of these means have long historical backgrounds. A short history of the sequence of means may prove enlightening. The printed book was probably the most pronounced of all means; it provided a way of learning from others when others could not be present. Direct learning between one person and another has always been a common means of becoming informed or trained; printed materials made indirect learning possible. Similar to printing was the written message. A blackboard was necessary in written communication, as were pencils, slates, tablets, and paint brushes. Study of real things as objects, pieces of apparatus, and living organisms followed. After some time the silent motion

picture and the sound motion picture entered. Today, all these have been taken for granted as means in teaching; they are considered essential and beneficial. Within recent times the radio has been added to the list of means. It is now looked upon as a common means, but it has not revolutionized instruction. The arrival of television has made it necessary, once more, to grapple with a new means. It seems that the entrance of a new means is always hailed as the greatest ever, that it is a boon to mankind, that mass education is possible, and that the old must be discarded for the new innovation. When the sound motion picture made its appearance, some educators said that the new audio-visual aid would enhance the swiftness and progress of learning, that pupils would be able to learn twice as much in the same time, that the slow learner would surge ahead by leaps and bounds, and that the problem of motivation was met once and for all. Today, the same advantages are upheld for radio in some degree but for television in a startling degree. For a teacher who must keep his feet on the ground, these pronounced superiorities for any means must be carefully studied, examined, and evaluated. If the past is any indication of the future, it seems safe to predict that even television will not change too markedly the general course of instruction in secondary schools. Television will have its place, but it will not displace all other means.

Learning will always require effort; field trips, motion pictures, radio, television, and other sensory aids will never bring education just for the asking. There are five types of learning; all that one learns must come through one or more of these types; the internal nervous system must be employed no matter what means from the outside may be used as stimuli; and no outside stimulus is in itself a substitute for the effort that must be made within before attainment of aims is possible. A stimulus is not in itself learning. All that a means possibly can do is to help in the arousal of the internal mechanism for learning. If one must be able to spell certain words, he must have the appropriate types of learning stimulated from the outside, but the internal effort must be made just the same no matter if the words are printed or written in blue or red, big or small, or pronounced softly or

loudly. The types of learning and the principles of teaching will be there for fulfilment no matter what external means may be employed. Means may facilitate, but they are not learning processes.

In spite of radio and television and other means that are used to reach many or even millions of persons at the same time, the bulk of teaching will be that personal part in which one person teaches another person or small groups of individuals; in brief, that face-to-face personal relationship has stood the test of time. Objectives, motivation, guidance in use of the types of learning, organization, diagnosis, remedial teaching, provisions for individual differences, and the physical and social environment all depend upon personal knowledge of pupils, their backgrounds and experiences, their interests, their abilities, and firsthand study of them. These can be accomplished most satisfactorily by living and working with a pupil or pupils over a relatively long period of time. Personal study is especially important in teaching elementary- or secondary-school pupils who are in the formative period of their lives.

In so much learning, time is an important factor. Reasoning out solutions, thinking out reasons, seeing relationships, forming percepts, developing skills, and unifying experiences are slow and painstaking processes; they require time, and they are at the very basis of all genuine learning. These, too, are individual processes; they cannot be by-passed through watching or hearing another person do them or tell about them in the span of a few minutes. Self-activity in learning cannot be violated if good results are expected.

There are limits in the possibilities of any one means. A wise teacher does not put all the eggs in one basket. Judge the part any means can play; use a means for what it can accomplish.

Uses of television.—Television will probably be used, for the most part, to fulfil these purposes:

1. To increase perceptual backgrounds by seeing pictures of and hearing descriptions of other parts of the world
2. To understand industrial processes as lumbering in the north woods, manufacturing of various products, mining of coal

3. To gain knowledge by observing and listening to dramatizations of literary productions and past historical events
4. To keep informed by seeing and listening to on-the-scene events as inaugurations, committees in session, investigations, and current happenings
5. To gain information by listening to speeches, current news broadcasts, and informational lectures
6. To watch and study various processes as how to make, how to care for, how to construct, and how to manipulate
7. To profit from leisure and recreational activities by participating vicariously in sports, dramatizations of light stories and plays, pictures and accounts of travels, and musical productions

The distinction between radio and television is that one is entirely auditory while the other is both visual and auditory. The similarity is that both require listening. It may be that one can listen to a speech or some discussion over the radio and get more out of it than he would by listening and seeing at the same time; in other instances the reverse might be true. A vivid imagination and rich past experiences equip one to sit back and listen and learn without use of the eyes. In many persons the creations of imagination are better than those on the screen.

In learning there is no substitute for reality. A picture of a man is not the same as actually seeing the man. So it goes all along the line of learning. Studying a flower by actually having the flower in one's hands, pulling it apart, examining the parts, feeling the texture, smelling it, and probably tasting it are much more effective than watching some person on the screen do these and tell about them.

Suggestions for using radio and television programs in classroom instruction.—

1. Have objectives in mind first, then use programs that will advance further attainment of them. Be sure that programs are just as effective or more effective than other means that may be employed.
2. Be sure that timing is appropriate for the particular sequence in learning. If programs are used at the right psychological time in learning, the learning will be more effective. This suggestion holds for all sensory aids. Unless the aids are subject to teacher control, timing is likely to be too soon or too late in the proper development of aims.
3. Getting the learner ready for the program is important. He should feel the need of the means in his learning. This readiness should fit in with the particular topic or phase of the work under development in the classroom.

4. Since radio and television are means requiring intensive listening, it will be profitable to teach pupils how to listen. Listening is not easy; it is as difficult as intensive reading. A good listener listens for a purpose; a pupil, likewise, should listen to gain something that he considers of value. What he gets from listening is intensified if discussion follows; hence, the ideas gained through listening should be brought into class work in some way soon afterward. Merely listening because the teacher says so, without any reference to or use or review of what was seen or heard, will soon wear off as a class project or learning exercise. Concentration and organization are required during the listening period and immediately afterward, or retention will be fleeting. Note-taking during listening should be reduced to a minimum; main points are enough, the details can be held in mind if concentration is deep during the listening period.
5. Be certain, if possible, that the program is suited to the age and ability level of pupils. If the program is worked out by a school system with its own station or by a university or some organization empowered to prepare and broadcast or televise educational programs, then the purpose can be geared to a certain age or grade group.
6. Help pupils to know and gain from good programs. Some of these programs will be of interest to music lovers, some will be suitable for social studies people, while others will be of profit to science majors or groups of various interests.
7. There is the recreational side of life as well as the vocational or more demanding phase of living. Assist pupils to use their leisure time profitably by utilizing programs that meet the intellectual-recreational purpose as well as the pure entertainment phase.

At this writing the potentialities in educational television have been determined experimentally only on a small scale. A few experiments seem to indicate many future possibilities. The Federal Communications Commission held open 242 television channels for educational use until June, 1953, with a possible extension of time in the offing. If many or most of these channels revert to commercial use, then strictly educational purposes must be served, if at all, by partial sharing of time over commercial stations. The reader of this book is now in a better position to know the progress in the educational use of television than the author was in early 1953. May that progress be sure and continuous.

APPLICATION EXERCISES

1. In what subjects does drill play a very small part? An important part? What is it that determines whether or not there should be little or much drill?
2. Can you think of several instances in which the original learning should be so solid and substantial that drill is unnecessary?

3. Plan a good drill exercise in some phase of English, a foreign language, mathematics, or science.
4. How would a review at the end of a course in American history differ from a review at the end of the period of colonization? Select a few relationships and understandings which grow more and more significant in the study of our nation from early colonization to the present day.
5. "Learning by doing" is a guide, to be sure, but is it likely that teachers may defeat the ends of real learning by taking a full literal meaning of the expression? Explain.
6. Can you differentiate between pupil participation in learning and pupil participation in teaching? Illustrate.
7. In what ways could radio and television supplement classroom instruction? What phases of instruction do you think will always be dependent upon close personal guidance by the teacher?

RELATED READINGS

BOSSING, N. L. *Teaching in Secondary Schools,* chaps. xiii and xvi. 3d ed. Boston: Houghton Mifflin Co., 1952.

BURTON, W. H. *The Guidance of Learning Activities,* chap. xviii. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

GOETTING, M. L. *Teaching in the Secondary School,* chap. xiii. New York: Prentice-Hall, Inc., 1942.

HARRISON, MARGARET. *Radio in the Classroom.* New York: Prentice-Hall, Inc., 1939.

KINDER, J. S. *Audio-Visual Materials and Techniques,* chaps. xvi–xviii. New York: American Book Co., 1950.

LEVENSON, W. B. *Teaching through Radio.* New York: Farrar & Rinehart, Inc., 1945.

MACOMBER, F. G. *Teaching in the Modern Secondary School,* chap. xii. New York: McGraw-Hill Book Co., 1952.

NEWSON, C. V. *A Television Policy for Education.* Washington, D.C.: American Council on Education, 1952.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* chaps. x and xxvi. 2d ed. New York: American Book Co., 1947.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chap. x. New York: Appleton-Century-Crofts, Inc., 1948.

WITTICH, W. A., and SCHULLER, C. F. *Audio-Visual Materials,* chaps. x and xv. New York: Harper & Bros., 1953.

WOFFORD, K. V. *Teaching in Small Schools,* chap. x. New York: Macmillan Co., 1946.

CHAPTER XVII

SOCIAL DYNAMICS IN THE CLASSROOM

LEARNING is influenced by many forces that are constantly at play in the lives of all of us. If any of these forces can be utilized in the guidance of classroom learning, they should be tapped. Learning, in general, proceeds because there are interests and needs to be satisfied. Satisfaction of interests and needs is realized by an individual through his own initiative or through the stimulation provided by others. Although the distinction between the two general sources is not and cannot be clear cut, the separation is made here for the purpose of presenting the forces associated with individual initiative as contrasted with forces coming under the heading of social stimulation.

It must be admitted at once that a large part of learning is an individual's responsibility. One must, in the quiet of his own life and in the stillness of the night, think and ponder and reflect alone about what is to be learned. Probably this phase of gaining power has been neglected in present-day planning. There will never be a substitute for work no matter whether that labor is physical, intellectual, moral, or social. In other words, to become a strong and self-confident and capable individual, a person must put forth the effort. We pay the price for educational gains as well as for any gains of value. Learning more effectively and efficiently is mental economy, but in spite of everything the effort must be made. What time is saved in learning will need to be used in learning more. Demands of living are increasing. Gaining a worth-while education will never be effortless.

On the other hand, if there are forces in addition to the individual urges that would influence learning still more, these forces should be utilized to the fullest extent. It seems that some strong forces of a social origin have not been used nearly so much as they should be in classroom teaching. Since releasing the energy of pupils is a principle of teaching immediately connected with forces prompting pupils to action, then the forces latent within the social environment should be investigated.

Social forces are right there within the classroom, ever ready to be released if one but knew how to utilize them in guiding learning. The use of these social forces in the promotion of classroom learning is the instructional phase of social dynamics.

Meaning of social dynamics.—"Dynamics" is a word from science denoting power, moving forces and the laws regulating them, energy and the changes produced by it, and active as opposed to static. "Social" refers to society or a social organism; in brief, to human beings as they live and play and work in groups. In this discussion, the term "social dynamics" will denote the influences one person exerts upon others or the influences that others exert upon one person. The teacher and the members of a class compose a social group in which social forces are at work to influence favorably or unfavorably the development of all. If the right forces are utilized, the group will profit accordingly; if the wrong forces or no forces are at work, the group will suffer accordingly.

Illustrations of social dynamics.—The first illustration will be of the simple variety, but it will bring out the idea. A pupil had given an answer to a question by the teacher after which the teacher remarked, "Now, isn't that a silly answer." The effect of this remark must have produced a feeling of resentment upon the whole class as well as within the one who answered. Will other members of this class want to answer after this cutting evaluation? What pupil will be motivated to give orally the result of his thinking to future questions? Here is a force unleashed that will not increase group dynamics; it will, on the contrary, destroy or greatly diminish effort, kindly feeling, and group co-operation. If the teacher had given the pupil a hint that guided thinking to an answer that was worthy, if the certificated psychologist of learning had been at least polite, if the legal representative of the teaching profession had asked others for their opinions to the same question, the good answer could have been secured without destroying initiative and good will by unkind words. At any rate, it is an example of negative group dynamics.

The second illustration is likewise simple but still funda-

mental. A little praise now and then is in line with a longing of human beings. Psychologists say that there are needs of the human body as great as hunger and thirst, and among these is social recognition. It is a kind of reward for effort. A teacher praised a member of the group for giving a good answer to a question by saying, "William, your idea about that problem is one most of us are likely to overlook; I am glad that you thought of it." Will William be inclined to think at another time? Will other members of the class be disposed to give answers to future questions? This remark by the teacher produced a feeling of good will; it encouraged initiative; it capitalized upon a need in human beings. That remark generated a force making for better learning. It is an example of positive social dynamics.

Values in social dynamics.—Not all the forces that make for release of energy are initiated from within, although the potential is within. In many instances it is an outside force that stimulates a latent source of energy from within. The desire to receive a little recognition is a within-potential, but some outside stimulation of that potential is the only force that will give it an opportunity to respond. The response in turn should be directed into activities that result in more learning than would ensue without that social arousal. One need not consider social dynamics as anything new in pedagogy, neither must he regard the term as a patent by "progressive" education or any other brand of education. The essence of social dynamics is the heritage of all teachers. Today emphasis is placed upon dynamics for the sole purpose of bringing into play those social forces that have been too often overlooked and neglected in the promotion of learning. To use only some of the forces is to lessen the effectiveness of learning. After all, the job of any instructor is to promote learning, and any additional knowledge of the forces that enhance development should be fully employed.

Teaching methods and social dynamics.—So many outcomes depend partially or wholly upon the influences exerted upon a person by other persons for their attainment. In other words, personal forces are as fundamental in some learnings as are textbooks, tools, reference materials, visual aids, pieces of apparatus,

maps, machines, and chemicals. The ability to do bookkeeping may require little or no personal force from the outside in its development and application because one deals with figures and books, but an entirely different set of factors is encountered when one attempts to learn how to live with others, to get along with people, to respect the rights of associates, to participate in plays and games, and to play one's part effectively and humanly in numerous group undertakings. The latter abilities are inseparably tied up with other people; in short, these abilities are acquired by means of others and they are exercised upon others. When these aims are at stake, no textbooks and no artificially devised materials will ever take the place of living individuals as forces in effective method. Democratic living does not exist in a vacuum. It cannot be learned there either. It is learned and lived in a real social setting.

Social forces in method cannot be shaken out of the complete instructional process and set aside as specified factors of educational sociology, because educational psychology includes within its scope of study all stimuli, the social included, which bear upon learning. Therefore, social forces in teaching must necessarily be based upon those parts of the whole realm of method which are particularly dependent upon social stimulation.

In a typical school environment two social situations will adequately include all the conditions of a sociological nature coming under the implications of method. The first of these is found when the teacher is considered the main source of stimulation, and the second includes those instances where all pupils and the teacher constitute a group. In either situation, method is thought of in connection with a particular learner.

The teacher as a social force.—Within recent years considerable emphasis has been placed upon the teacher as a vital element in the program of education. Initial selection of potential teaching talent is given equal weight with subsequent training. The Regents' Inquiry into the Character and Cost of Public Education in the State of New York is strikingly weighted with the importance of the teacher, and the conclusion is based on

results actually obtained.[1] "As is the teacher, so is the school" still rings true, and with even clearer and sharper tone. Every investigation shows the teacher as paramount. Now, what is behind the picture? Can it be that knowledge and application of teaching techniques and devices make for the difference in results? Is some high-powered concept of the activity program responsible? Surely, there must be an additional consideration. The evidence seems to indicate that this extra factor, this determining element, is the social power of one person acting upon others. It is the social stimulation of the instructor acting upon his pupils. The force of personality works along with mechanical phases of method, but it is always above routine aspects of instruction.

If the seeing of a motion picture produces significant changes in attitudes, is it not reasonable to believe that the pupils' constant observation of the real-life drama of a teacher in action should produce more profound changes in attitudes? Is not a teacher through his portrayal of sincerity, sympathy, patience, outlook on life, broad-mindedness, and scientific interest as effective a visual aid as a slide or motion picture? Cannot one learn by seeing a living demonstration as well as from watching a mechanical performance? The social force of the teacher is being recognized as an essential and vital component in the resulting effectiveness of method, and this is especially true when the so-called intangibles of learning are involved.

Child psychologists state that irritable and nagging parents can visit the same afflictions upon their children. A large city school system is planning to eliminate emotionally unstable teachers because the pupils under these persons are influenced adversely. These two instances are examples of social forces which are detrimental to the proper development of wholesome personalities.

Not all the worth of social forces, however, is exhausted in the promotion of strictly moral and intangible learnings. In purely academic and intellectual pursuits the personal attributes of the

[1] L. H. Gulick, *Education for American Life* (New York: McGraw-Hill Book Co., 1938), p. 40.

teacher play an important role. The interest that a pupil takes in his subjects, the energy he spends in studying them, the progress he makes, the way he thinks, and the judgment he uses may be and generally are significantly affected by the social stimulation emanating from his instructor.

Several quotations from Baxter's study of teacher-pupil relationships follow:

> Children who are to live and work in a democracy and be responsible for its functioning need to learn to think critically and to be discriminating. Pupils in Miss X's room were enjoying that privilege and practicing those very virtues because they had a teacher who considered their development in this direction her responsibility. She realized that it was her duty and privilege to keep herself free of prejudices which might be blinding. Her own determination to think and act for herself but with regard for others caused immature pupils to sense the fairness and wisdom of this course and to behave likewise.
>
> There were no sarcastic nor insinuating remarks used in this teacher's classroom. The visitor saw evidences of a respect for pupils' personalities in the teacher's manner of dealing with pupils and in the regard with which pupils held each other.
>
> Like her, they showed an unusual interest in books and in dramatical portrayal of their stories.
>
> Miss X thus affected the thinking and social outlook of the pupils who came in contact with her. She was personally able to maintain a classroom environment which exerted a positive and pleasant influence upon not only self-learning but also upon social learning.[2]

Many causes may be responsible for the full attainment of aims; however, among the causes must be included the influences exerted by the enthusiasm, examples, ideals, and attitudes shown and lived out by the instructor. His personal force and influence are the final determiners of the power of his method. So, again, the personal stimulation of the teacher always shines through and above every instructional procedure.

The group as a social force.—By a group force is meant the stimulation an individual receives by being among and working along with other persons. The stimulation consists of all stimuli that make one conscious and aware of the thoughts, feelings, ideals, and impacts of whatever nature coming from the mem-

[2] Bernice Baxter, *Teacher-Pupil Relationships* (New York: Macmillan Co., 1942), pp. 105, 114, 112, 117. By permission of the Macmillan Company, publishers.

bers of the group. One is always aware of the fact that he is in a group, and any phase of that awareness can be interpreted as stimulation caused by the presence of others. Group forces are exceedingly important in bringing about many changes in personal behavior treasured by society. Of course, the kind of society to be perpetuated determines the forces that will be utilized.

The earlier emphasis upon wide transfer of training has been superseded as a result of extensive investigation, by a recognition of the fact that one learns best to attain what he wants to know or to be by driving straight for the aims. The inference here is that what one does while he is learning is what one does in putting that learning to the test afterward. A person does not learn one thing and apply another but rather applies as he has learned to apply during the learning period of formal school training.

In education attention has always been focused upon means and methods. At the present time, however, an intensive campaign is being carried on to discover new procedures to safeguard democratic life and its preservation. There is nothing spectacular or entirely different in this movement from the general movement in educational method. In both movements more expedient measures to attain desired ends are the lines of approach. Previously, most of the effort was expended in determining the means to produce specific skills and informational acquisitions. So there appeared techniques in teaching spelling, penmanship, typing, and similar mechanical or informational abilities. At present, educators are through necessity stressing ends that lead to better social adjustments to the many situations needed in living in a civilization where individuals must depend upon one another for the more abundant life. A different interpretation of life has brought the question of a more fruitful method to the fore. If education is for the purpose of helping pupils to live as they should now and as they will be called upon to live as adults, then instructional procedures need to be filled with the kind of stimulation that leads to the goal.

About two decades ago the socialized recitation was sponsored as a method particularly potent in promoting the growth

of co-operation, responsibility, respect for the opinions and rights of others, and a personal obligation for the success of group undertakings. In practice, however, the spirit of the procedure was too often subordinated to the position of a device for testing of facts and information. Values as a socializing procedure were lost. Regardless of its low ebb for a while, the method is gaining strength again. Now the stress is placed upon the original values. Most significant of these is intellectual honesty. If mere opinion is advanced, the pupil admits the source of his remarks. He learns, too, that other pupils have opinions. Too much reliance on one's own ideas may be rooted out by the facts presented by members of the group. Broad-mindedness and critical attitude are fostered by dealing with problems and issues that demand the exercise of these two mental qualities, and any unwarranted violations of these qualities are gently but firmly corrected by group disapproval. Tolerance is gained, but not tolerance for loose and spurious thinking. Grappling with problems, searching for the truth, weighing the soundness of opinions, thinking before jumping at conclusions, and studying the motives of others are surely attainments nourished by group interreactions. The social forces here are absolutely necessary to give this method effectiveness.

Skill in the use of English is stimulated by the audience setting. Instead of talking before mirrors or reciting some masterpiece behind closed doors, pupils talk directly to the class, and every aspect of a life-situation is found in the learning environment. A pupil looks at faces, he observes expressions of approval or disapproval, he plays on emotions and emotions play on him, he endeavors to change the opinions of others, he tries to convince and persuade; in short, he uses English for a purpose. If language is a social institution, then the language is learned best under social pressure. The presence of classmates must necessarily act as the main incentive. Merely memorizing rules and filling in blanks is an artificial way to inculcate command of expression. Since English is for a social purpose, it should and must be learned while meeting a social obligation.

While the preceding illustration shows a trend toward the

utilization of social forces in a relatively common and accepted learning activity, there are still more dynamic and penetrating opportunities in method for the application of group forces in promoting the development of pupils. So close do the forces merge into the total activity that one might say they are primary, not secondary. Witness, for example, the immediacy of social pressure in playing games. Here one rubs elbows with competitors; self-control must be exercised, otherwise the group members take a hand in the matter and chastise the offender. One must co-operate, take his turn, take his knocks, grin under difficulties, give all he has, and act his part as a gentleman. This kind of learning is characterized by direct participation. In many classrooms a pupil hears about what should be done or memorizes rules of conduct, but in group participation he feels and experiences what should be done. He is performing in the realm of reality.

With the last idea of participation in mind, the shift to numerous applications of direct social experiences as ingredients of method can easily be followed.

The program of physical education is rapidly changing from one in formal gymnastics to direct participation in various games and sports. Objectives are both physical and social in nature, but the social outcomes of co-operation, good sportsmanship, fair play, team work, and dependability are receiving more consideration. Some critics even maintain that a pupil learns more citizenship in these activities of physical and mental impact and contact than he does in the designated citizenship and social problems classes. This may be the statement of enthusiasts for their own subjects, but it is true that many citizenship traits and abilities are based on action; the development, therefore, must be achieved by a method that is bristling with forces as nearly as possible comparable to those found in life. Good sportsmanship is learned best in an environment where the essence of such behavior is felt, experienced, and lived. That condition is fulfilled where one participates openly and directly for and with other individuals.

With the plaintive call for a more vital and realistic concep-

tion of democracy in this land, educators and research workers are continually seeking more fruitful ways of attaining this objective. Whatever the new findings may be, there is some available evidence that will not be discarded; and this evidence points unmistakably to the necessity of deriving satisfaction from experiences with democratic ways of living. Democracy is experienced, not memorized. Values must be derived, felt, and treasured before a pupil or an adult generates concern over the preservation and perpetuation of them. So the trend in method, whenever good citizenship is involved, includes all forces that lead most effectively to the outcome desired. Chief among these forces are the social ones. Democracy is learned by living in a democratic home; it is made stronger by living and participating in a democratic school; it is further strengthened by working with classmates and associates in planning and carrying out measures and projects for the continued improvement of classroom and school life. A class in civics departs for a while from the study of textbook materials; the members investigate the methods of garbage disposal in their own village. They plan the steps in the investigation; they allocate sections of the town to certain pupils for study; dump piles are located and tabulated; conferences with homeowners are held; stores are examined to determine protective measures taken against flies; science is studied in connection with the spread and control of diseases; plans for improving conditions are drawn up and presented to the village governing board by the class. Here is democracy at work. Group action is directed toward the preservation of the common good. Method here is teeming with social forces.

The Regents' Inquiry reveals that pupils who finish high school are indifferent to and not concerned about the active obligations of citizenship. They know about the structure of government, but they are reluctant to participate in community affairs. Could not the same indifferent attitude be found among adults as well? We learn by doing, and then we do what we have learned. In great part, many never did; therefore, they never do. Pupils who never learn to participate, to experience, to co-operate, to put a shoulder to the wheel, to join in group

undertakings, and to bear responsibility cannot be expected to do any of these. Passive learning leads inevitably to passivity in all forms of human conduct.

SUMMARY

The proper interpretation of method includes all experiences utilized in the promotion of learning. In practically every instance of learning in secondary schools there is stimulation of a pupil by the social forces emanating from the teacher and from members of the group. No longer can we consider method as merely the cold manipulation of techniques and devices. There is something of value in education beyond the cold storage of information, and that something includes what is commonly denoted as personality and character. When broken down, we see in personality and character the more specific components of beliefs, convictions, ideals, attitudes, dispositions, traits, and appreciations. For the development of these human powers and qualities, there must be more in method than reliance only upon pedagogical mechanics. Living, in a social order where human values outweigh all other objectives of education, demands an environment surcharged with forces conducive to the highest attainment of these values. It is consoling to see in secondary-school methods the trend toward an ever increasing emphasis upon the utilization of social forces as determiners of pupils' development.

APPLICATION EXERCISES

1. Do not lose sight of the principles of teaching regardless of the topic discussed. Which principles is a teacher fulfilling if social forces are utilized to a maximum degree?
2. List several objectives of real value for adolescent pupils and then point out wherein social forces would or would not play a part in their attainment.
3. It is said that the best audio-visual aid is the teacher. What does this mean? Illustrate.
4. "Your actions speak so loud I cannot hear what you say." In what way is the meaning of this statement associated with social dynamics?
5. There are two jobs to be done. In one you are to give a talk to your class. In the other you are to keep a record of everything the teacher says and write it up in your notebook for review purposes. Which job will you probably do conscientiously and carefully? Explain why.

6. Superintendents and others who hire teachers generally want to have interviews with the candidates. In addition, they want recommendations from persons who know the candidates. Can you give any reasons why the persons hiring teachers insist upon having interviews and recommendations?
7. There are many reasons why pupils drop out of secondary schools, but one reason frequently given by the drop-outs themselves is that they dislike certain teachers. Explain.
8. Many pupils like schools so much that they would not miss a day for anything. On the other hand, many pupils dislike school so much that they would miss for the slightest excuse, some even play "hookey," and a few are real truants. What makes for this like or dislike for schools among pupils?
9. Probably teachers and ministers are restricted more in their outside life than are any other professional workers; they are often criticized for smoking, drinking, playing pool, attending horse races, and even for dancing. Other professional people are not under the same social pressure. Could there be reasons for the difference?
10. Go back in memory to your days as a pupil in high school. Were any of the social forces mentioned in this chapter influential in making you the kind of person you are today? Illustrate.

RELATED READINGS

ADAMS, FAY. *Educating America's Children,* chap. ii. New York: Ronald Press Co., 1946.

BAXTER, BERNICE. *Teacher-Pupil Relationships.* New York: Macmillan Co., 1942.

BURTON, W. H. *The Guidance of Learning Activities,* chaps. viii–x. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

COLE, LUELLA. *Psychology of Adolescence,* chaps. vii–viii. 3d ed. New York: Rinehart & Co., Inc., 1948.

CUNNINGHAM, RUTH, and ASSOCIATES. *Understanding Group Behavior of Boys and Girls.* ("Teachers College Publications.") New York: Columbia University Press, 1951.

NATIONAL EDUCATION ASSOCIATION. *Learning the Ways of Democracy.* Washington, D.C.: Educational Policies Commission, 1940.

PRESSEY, S. L., and ROBINSON, F. P. *Psychology and the New Education,* chaps. vi–ix. Rev. ed. New York: Harper & Bros., 1944.

SCHORLING, RALEIGH. *Student Teaching.* Rev. ed. New York: McGraw-Hill Book Co., Inc., 1949.

SIMPSON, R. H. *Improving Teacher-Learning Processes,* chap. xi. New York: Longmans, Green & Co., 1953.

STILES, L. J., and DORSEY, M. F. *Democratic Teaching in Secondary Schools.* Chicago: J. B. Lippincott Co., 1951.

WILES, KIMBALL. *Teaching for Better Schools,* chaps. iii–viii. New York: Prentice-Hall, Inc., 1952.

CHAPTER XVIII

THE PLACE OF MEASUREMENT IN TEACHING

THE primary responsibility of an instructor is to bring about the maximum degree of achievement in learning. From the beginning to the end of teaching, the thought in the mind of the one directly concerned with instruction is: Has the desired amount of learning taken place? The mother, the father, the minister, the coach, the health director, or any person interested in the progress of others is perpetually concerned with that question. Everyone responsible for another's growth is eager to initiate and foster progress, and afterward he is equally interested in knowing the results of his efforts.

Measurement always in operation.—Although measurement is generally thought of in connection with relatively long written examinations, it can also be considered present whenever one attempts to ascertain how well learning has taken hold. Throughout the work from day to day there are innumerable occasions offering opportunities to judge and determine quite accurately the status of progress. The key to all measurement is the response; and any form of response, be it oral expression, home work, manipulation, construction, drawing, or experiment, helps to determine achievement in a definite, but probably limited, way. Treated previously under the principle of diagnostic and remedial instruction can be found a number of examples showing constant diagnosis in the daily evaluation of learning. In answering questions, solving problems, during conferences, during directed study, and in other response-making situations, the pupils open, as they would a book, their levels of grasp and achievement; and, if a teacher is alert, she discovers these levels and is, in all truth, determining progress or measuring results. Occasionally, written examinations are used to supplement the discoveries made by daily contact methods, and it is that written part of measuring which will be developed in this chapter.

Time devoted to testing.—So large do the proportions of time given to written examinations mount in secondary schools that one is forced to stop and evaluate the whole examination system. Here is one school which takes 20 per cent of the pupils' time for writing examinations; and, when the tests are over, no corrected papers are returned, no comments are made; only little marks go into the records because four examinations, each an hour in length, must be averaged for the monthly report cards. Grades! Grades! Grades! What matters, so long as there are laboriously derived grades! In another school so much time is spent in testing that it is almost impossible to find an instructor teaching at any time. Another school must abide by an authoritative ruling which prescribes a daily quiz and an hour examination on Friday. Few schools ever fall very low in budgeting time for testing. Ask teachers about the six- or eight-hour day, and they will invariably remind you of the correcting of examinations until the wee hours of the morning. There appears to be the strong triumvirate of assign, quiz orally, and then give written examinations. No wonder our schools have been called grade factories! No wonder the written examinations are the means to turn out grades! There is always a means when there is an aim—aim for grades, and the examination is the inevitable means.

PURPOSES OF MEASUREMENT

Doubtful purposes.—Surely the reader feels somewhat disturbed by this time, and the question that might come from a troubled person would be: "Why spend so much time in measuring?" This question needs to be settled by determining the influence of examinations upon learning. No one would endeavor to justify the statement that valuable learning results during the time spent taking examinations, because an examination itself serves to test past acquisitions. Neither can it be held that the securing of grades justifies a disproportionate amount of time for examinations. Can it be maintained sincerely that many examinations are needed to keep pupils motivated? Are the reminders, such as poor grades, failures, loss of recognition, disappointment to parents, and repeating subjects, the highest forms of motiva-

tions? If they are, then the path to follow in producing diligent, steadfast, and everlasting application from pupils is within reach and easily attained. Can it be true that many examinations are necessary as stamping-in and review devices? Is forgetting so powerful that about as much time is required in retaining as is required in attaining?

Primary purposes.—At this time another question comes up for consideration: "What influences should examinations exert upon learning if the influences already brought forth are questionable?" The influences should be judged simultaneously in two ways: (1) as good influences in themselves or (2) as good influences depending upon the manner of use. For example, examinations may stimulate pupils to review and retain knowledge; but, should this practice of reviewing become too prevalent, it may interfere seriously with the gaining of more ideas and knowledge. When this constant review and testing notion becomes all-important in the philosophy of a teacher, she throws her being into the testing part of her work and almost forgets that there is a teaching phase. If teaching were done better, there would be less need for so much emphasis upon testing. Anything well taught and learned does not require this perpetual fear of examinations to keep it where it belongs. The following purposes of written examinations seem highly influential in their bearing upon learning.

1. *Review.*—An examination should serve as a stimulus for review. In other words, a clear notion of the standards expected should precede the giving of the test in order that learners may build up their units of learning and thereby foster in pupils that valuable training which comes by looking back, by recalling, by organizing, by taking inventory of stock, by gauging understanding, by seeing as a whole all that pertains to a significant unit. In so many cases teachers are afraid that pupils may discover what the examination will be about; there is a feeling of secrecy which must not be violated; on the contrary, the objectives to be attained, the understandings to be derived, should be set out in bold relief, thus making preparation for learning reasonable, open, and clear. Why fear if good records are made, if those

records show mastery of the objectives of the highest value actually stressed during the study of a significant unit? Is not mastery what is expected? Or are there some mythical and unheard-of and untaught-for aims which are to be sought out so pupils will be made to appear as morons? Examinations can and should be made to serve the purpose of stimulating learning. By having set before them the standards of achievement expected, the pupils know the ends and are in a position to study so as to attain the objectives set forth.

2. *Criterion of understanding.*—If an examination is to provide a stimulus for review, then the review should be such that linking and strengthening during the review shall be related to a phase of development which requires additional unification. An examination, then, as typified by the written hour examination, to be in conformity with the review purpose, should come when it affords pupils an opportunity to determine their own degree of attainment of a unit or a significant part of a unit of learning. But the general practice in education has been to inject examinations into learning according to set days or at any time when nothing else is planned or ready. As opposed to this impulsive injection, the examination should have a psychological time for its entry, and that time is at the end of a unit or at such time as a significant understanding is to be tested. Well, a criterion of understanding cannot be secured by the jerky, fill-in, Friday or Monday injection of examinations. Some teachers think that pupils will dissipate in harmful activities if the impending examination on Monday does not hold them in check. Why would not original learning hold them in line better than the worry of a test? Why cannot pupils pursue a line of reasoning or study over a series of days, Fridays and Mondays included, until they have built up a unified and comprehensive structure of learning without the spasmodic breaks and reverberations of another test?

3. *Diagnostic and remedial purpose.*—Measurements of all kinds, as used in connection with teaching, have as their most valuable purpose the diagnosis of progress. The results of an examination covering a comprehensive unit of work give each

pupil an index of his attainment, and the successes and weaknesses stand forth as learning completed or partially completed. Diagnosis begins at this stage for the pupils as well as for the teacher. Diagnosis, as frequently interpreted, refers only to the discovery of shortcomings, but it can at the same time measure standards of achievement. If, in an examination, there are discovered some pupils who show a high degree of achievement and others who show many shortcomings, then the teacher and the pupils know the next moves in learning. The teacher profits because she teaches to remove the deficiencies, and the pupils profit because they study to remedy their specific weaknesses. Simultaneously, the work takes on a personal significance for both teacher and pupils, because both know the specific weaknesses with which they are to deal.

Special stress needs to be laid upon teaching as the direction and stimulation of learning. When testing is substituted or mistaken for the chief duty of instruction, then instruction does miss widely its valid purpose. And, when testing is used, its primary purpose, too, is the promotion of better learning. The ever prevailing triumvirate—assign, quiz orally, give long written examinations frequently to determine grades—must be forced into the discard. In its place should be substituted those activities which are in agreement with the best principles of initiation, direction, and promotion of pupils' progress. Throughout this book the central line of reasoning has set forth these principles, and the problem in determining how it has been with learning is a continuation of those principles, not a break with them.

Grades.—Up to this point little encouragement has been accorded to grades as primary purposes of examinations. As the work of secondary schools is now gauged, some consideration should be given this topic because teachers will be called upon to differentiate in some way the work of pupils at stated intervals or at the end of a semester or at the close of school. If such demand is made, then it must be met by positive means of some kind. It seems that grades can be easily derived as by-products while still holding to the real purposes of measurement as means to influence the learning process advantageously. The secret of

securing grades as by-products can be discovered only through that teaching philosophy and that teaching emphasis which hold high and lofty and important those characteristics of learning which unknowingly submerge in pupils' minds the memory of grades. Must the true spirit of study always be lost in the scramble for grades? Must the desire to know, to be, to do, to improve, to be cultured, to be useful, always be calibrated and motivated by marks? Here is a teacher who periodically warns and scolds and threatens about grades; there will be flunks and failures and tears and disappointed parents if the next tests do not reveal higher grades; unless there are better grades, some will not be graduated, some will be off the honor roll, some will not be promoted. So the philosophy and the teaching tingle sharply and penetratingly of grades as the ends. Here is another teacher who holds high and important the joy of knowing, the satisfaction of doing something well and thoroughly, the pleasure in doing and thinking, the gratification in doing more, the adventure in making progress; examinations, to her, are means to discover and assist, to help pupils evaluate their own degree of attainment, to give them advice and counsel, and to direct their activity into the lines most needed in further development. Her comments will be personal, and they will show an interest in individual welfare: "John, I want you to give more time to this phase, you did well in recalling information, but now we will both center our efforts upon strengthening your ability to see relationships." How different will measurement be when it is used to discover and assist! Then fear will give way to desire, because the results will be employed to direct learning. Tests need not be focused upon grade-securing; they should be employed for evaluating present status and helping future study. If grades are desired at times to denote achievement, pupils should realize that all possible means, tests included, have been used to make learning better. Testing must not become a "knock-down and drag-out" affair. It should be done as a means of assisting both teacher and pupils. When the human element disappears in testing, testing ceases to be sympathetic assistance and becomes cold routine.

CONSTRUCTION OF EXAMINATIONS

Within recent years a great variety of tests has been devised. There were faults found in the older ways of measuring, and, with this dissatisfaction as a stimulus, new tests have come into the field of measurement as improvements upon older methods. As a result there are true-false, completion, enumeration, matching, multiple-choice, best-answer, and other types of examinations. The reader is probably so familiar with these types, from experiences with them in his sojourn along the path toward higher education, that no immediate need exists for illustrations of each type. The reader is, perhaps, not so familiar with the criteria of tests, such as validity, objectivity, and reliability, and with the advantages, such as greater ease in marking and economy of time.[1]

[1] Validity means that the test really measures what it is intended to measure. You are in a class, let us say, in history, and the instructor says that the final grades for the semester's work are to be determined by the scores made in identifying fifty dates. You, in case you do not have a good memory for dates, will remonstrate by saying that a test of fifty time facts is not a fair measure to use in determining how much you know about the real objectives of history. You can say that the test is not a valid one or that the test lacks validity.

In correcting the exact reproductions of a final examination written by a pupil, it was found that teachers varied widely in the marks given to that examination; some of the marks were in the twenties, some were in the nineties, while the other marks ranged between the two extremes. The teachers were guided by their own opinions or their subjective evaluations. The test lacked objectivity. A test is objective when two or more persons correct it and give the same grades. Objectivity is obtained in a test by taking only the correct word, the correct number, or the correct response whatever it may be. If only the answer $2.50 will satisfy, then the pupil has the right answer or the wrong answer or no answer, and there is no room for opinion by the scorer. Two or more persons arrive at the same evaluation in correcting an examination in which only definite answers satisfy, and the test is then said to have perfect objectivity.

Let us assume that you have a certain degree of spelling ability. You were given a test yesterday and you made a score of 99 with 100 as the basis; today you are given another test with different words and you make a score of 25. In reality you are just as proficient in spelling today as you were yesterday, or vice versa, but the tests do not show this. We say that the tests lack reliability, that is, they do not give a reliable measure of your spelling ability. By reliability is meant that the tests measure consistently what they are devised to measure. If you are a good speller, then reliable tests should show that you are a good speller whenever the tests are given.

Standardized tests are tests which have been worked over carefully, tried out upon many pupils, and in various ways treated so that the validity, objectivity, and reliability have been established. Norms have been secured so that a teacher who uses standard tests can tell how her pupils measure up to the norms based

The guiding thought in construction of tests.—Form is often confused for substance in testing, that is, the types of tests may be considered all-important rather than the true possibilities and purposes of tests. One may know the techniques involved in constructing a multiple-choice examination, yet he may never have thought of the value of this type. So the first consideration in the construction of tests ought to go deeper than the techniques involved in making them; otherwise, a part of teaching again becomes the routine of mechanical manipulation.

First and foremost in testing should be this guiding thought: *Test for what you have taught.* Unwise and unkind is it to teach certain essentials and then to test for the least important or entirely different ones. In other words, tests should be governed by teaching, not teaching by tests; or, the aims determine the tests to be used; the tests do not determine the aims of greatest worth.

Early in the scientific testing movement in this country, beginning about 1900, effort centered upon making tests more specific and refined. Starch and Elliott performed a few investigations which showed that teachers varied widely in marks given to the same examination paper. Attempts were made to eliminate this wide difference in interpretation or evaluation and to secure more uniformity in grading. To do this, emphasis was placed upon objectivity. There had to be a definite answer and only one correct response. As a result, the so-called "objective tests" were devised to get responses that had one meaning to everybody. The essay examination was criticized and relegated to a minor position. It may be that the attempt to make tests highly objective has, in practice, squeezed out some of the validity of tests. Those elements of learning that can be made objective most easily are facts, rules, formulas, definitions, and other specific and definite associations. These specific learnings, however, may not be the most important. Within the last decade or two the objectives of education have

---

upon the work of hundreds or thousands of pupils. Standard tests can be secured from various publishing companies. These tests include directions for giving and correcting and helpful suggestions in using them.

changed considerably; more effort is made to develop understandings, appreciations, applications, insights, attitudes, ideals, thinking processes, study skills, and personality traits. If these aims take preference over memorized facts and fixed associations, then testing should change to meet the new conditions. Testing today is changing to measure modern concepts of values.

An illustration will help to make the foregoing discussion more understandable. There are five types of learning, but the ones that should be used to attain certain objectives call for careful selection by a teacher. Suppose we admit that the aim of highest value as far as the types are concerned is the ability to determine which type is the most effective or influential in attaining a certain outcome. One may have students in method courses memorize the types and then give an enumeration test in which the five types are to be written out. So far the ability to give the names of the types is all that has been demanded. Probably that is all that was taught about the five types; if true, then the professor has not taught aims of the highest value. To memorize these types just to serve the purposes of an examination is certainly not an aim most worth while in the preparation of teachers. It is one thing to know that there are these five types of learning but quite another thing to possess the ability to tell whether the right type is operating in the study of pupils. What kind of test would give the most evidence that a teacher has the ability to tell which type is the most effective?

Which type of learning is involved most in attaining each of the following abilities?

1. Being able to tell that the gas escaping from a bottle is ammonia ..... _____
2. Being able to write so that another can read your written work easily ..... _____
3. Being able to solve a difficult and original problem in geometry or physics ..... _____
4. Being able to say that a certain poem is the one you like most ..... _____
5. Being able to recognize the voice coming over the radio as that of Fulton Lewis, Jr. ..... _____

6. Being able to draw a map on the blackboard showing the states bordering on the Great Lakes . . . . . _____
7. Being able to state that the Louisiana Territory was purchased from France in 1803 . . . . . _____

This sample of the measurement of ability to select the type of learning most involved in the preceding learning situations is devised by the teacher because no other person has taught for exactly the same objectives or because no standard tests would be valid. Furthermore, the sample gets as close to application of knowledge as a paper-and-pencil test can go. Actual teaching would be the best test of application or understanding. Teachers, as a rule, will rely upon their own constructed tests, yet it is possible with a little thought and effort to construct measuring instruments that draw more and more upon understandings, applications, and other important outcomes.

Another illustration will be given to show how a test can be worked out so as to measure what has been taught. As you think through these items, try to feel the pull within that must be satisfied; this strain is surely greater than listing a few points about questions or the questioning procedure. Evaluate the following from the standpoint of what you have already learned about the use of questions or the questioning procedure in teaching:

1. John, why is a knowledge of Latin helpful to a physician? . . . . . _____
2. Was Adams or Jefferson the second President? . . . . . _____
3. Discuss the Articles of Confederation, William . . . . . _____
4. If a turkey weights six pounds while standing on one leg, how much will it weigh if it stands on both legs? . . _____
5. T.: Was Jamestown settled in 1607?
   P.: Yes . . . . . _____
6. In seventh-grade history class: Contrast the political philosophies of Hamilton and Jefferson . . . . . _____
7. T.: Who wrote "Evangeline"?
   P.: Longfellow.
   T.: Longfellow . . . . . _____
8. P.: Do both the senators and the members of the House have a voice in making a treaty?
   T.: Yes, a treaty to be legal must be signed by the President and a majority of two-thirds of the Senate and the House. (Evaluate teacher's answer.) . . . . . _____

9. Can you explain why it is colder in Wisconsin during January and February than it is during July and August? ..... _____

In some instances in the preceding test the question may be good, but the procedure is at fault. In some other items the purpose of the question may be trivial, or it may be commendable. Each item does require reflection by the person taking the test.

A third illustration will be given now to show how more evidence can be gained as to the soundness of learning. This set of items will illustrate an idea about measurement, but at the same time it will be a test of your ability to apply the principles of teaching. You are to figure out which principle of teaching is violated most in each of these situations:

1. Many pupils do well in their homework but do very poor work in examinations ..... _____
2. This teacher tells too much ..... _____
3. The industrial arts teacher said, "I'll saw that board for you so I'll be sure it's sawed off square" ..... _____
4. A teacher said, "If my pupils don't like to study, that's their business; my contract specifies that I teach, that's my business" ..... _____
5. Some teachers are constantly stressing facts, dates, and formulas ..... _____
6. Some teachers keep pupils after school every day because they are unable to do the work satisfactorily ... _____
7. A teacher gave a lecture on why there is continuous darkness at the North Pole during a part of the year and then expected pupils to know the reasons why ... _____
8. A teacher thought the temperature was just right, even though the thermometer reading was 83° Fahrenheit ..... _____
9. An old schoolmaster told his pupils to get help at home if they had difficulties with their lessons .... _____
10. A pupil who cannot understand the problem is told that he could if he really "use his head" for other puposes than a hat rest ..... _____

Up to this point emphasis in constructing tests has been focused upon the idea of giving the pupils an opportunity to demonstrate that they can make responses truly indicative of their mastery of whatever has been taught. Before pupils can

indicate this mastery, the teacher must be sure that the test actually measures the highest achievement expected from instruction.

Genuine possibilities in all types of tests.—Through careful construction all types of tests can be greatly improved and vitalized. We will say that the highest value from the study of grammar should be the ability to use grammar to express ideas in both oral and written situations. Let us dwell on the word "only" for a few minutes. One teacher may be satisfied if the pupils are able to give the rule for the use of "only"; the test then merely demands that the pupils give the rule. Another instructor may have an aim that requires pupils to use "only" to express ideas; the test, in this case, should afford the pupils an opportunity to demonstrate that they can use "only" to express ideas. This test, then, for want of a better name, might be called the "situation-reaction" type. Situations are given, and reactions are demanded. The purpose is to determine whether the pupils can make the right reactions.

1. *Situation-reaction type*
   Use *only* to help express the ideas:
   1. You were looking for three boys, but found one of the three.
      (.....)
   2. You and three other persons were searching for a man. You saw him, but the others did not.
      (.....)
   3. You saw a man. Somebody said that you spoke to him, shook hands with him, and ate with him. Express the fact that you saw him, but did none of the other things.
      (.....)
2. *True-false type*
   These statements help to discover if a pupil understands fundamental principles of science:
   1. The weight of 1,000 cc. of ice is the same as 1,000 cc. of water.
   2. The volume of a given mass of gas will be greater at 700 mm. pressure than at 650 mm. pressure (temperature remaining the same).
3. *Best-answer type*
   The power of discrimination is called into play in selecting the most vivid word scene:
   ( ) The horse went down the street quickly.
   ( ) The horse galloped down the street madly.
   ( ) The horse ran down the street swiftly.

4. *Multiple-choice type*

Meanings and feelings are tested in the following exercises:

Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time.

The underlying theme of the stanza emphasizes (1) sorrow (2) determination (3) sympathy (4) patience. ( )

The sun that brief December day
Rose cheerless over hills of gray,
And, darkly circled, gave at noon
A sadder light than waning moon.

These lines create a feeling of (1) gloom (2) peace (3) fear (4) joy. ( )

In an article by Read, test items that measure problem-solving abilities in science are cited. Two of these multiple-choice items follow:

On a hot day in August, the Memorial Bridge, over the river, leading to the new homes on the hill, away from the city, opened to let a tugboat and three barges go through. When the two halves of the bridge came down to the level again, the bridge would not close. Which one of these things would it be best to do?

1. Hammer the steel girders to make them shorter.
2. Have the fire-engine pump water from the river onto the girders.
3. Let the heavy fire-trucks run out on the bridge and push it down.
4. Wait until the sun goes down.
5. Let the tugboat pull the two halves of the bridge down.

The principle here is that of molecular motion as shown in the statement "Heat expands metals, loss of heat contracts them." There is also an element of plain common-sense thinking. The bridge would close soon after sundown, but during that time the fire-trucks might need to reach the new houses on the other side. One not-advertised bit of knowledge is that the river water would always be cool enough to shrink the bridge back to size.

A new road was cut through a basalt (trap-rock) hill for a half-mile. Signs were put up saying "Danger, Falling Rocks!" but there were two serious accidents when rocks rolled down the steep slope onto the highway on cold nights. The contractor agreed to do something to make things safer. Which of these was the best thing to do?

1. Install a simple heating system to keep the cold from cracking the rocks.
2. Put up flashing warning lights to slow down motorists as they go by the ledge.

3. Clean off the loose rock with a compressed-air drill.
4. Put a fine steel net over the whole face of the ledge so as to keep the rocks from rolling down.
5. Dig a deep ditch between the sloping walls of the ledge and the highway, and put up a wall between the ditch and the roadway.

Here are two principles at work; expansion and contraction, due to heat, break off the rocks, and will continue to do so. The other principle is that gravity causes objects to get as near to the center of the earth as possible. This *was* the roadway; now it is the ditch. The wall, of course, is to keep the cars out of the ditch. The idea of the net was not too bad, and so is a good distractor. Here the economic factor is important.[2]

Considerations in the construction of tests.—The following suggestions should prove helpful in the construction of test items:

1. Word questions and statements so that the intended meaning is clear.
2. Avoid ambiguity. "The first President of the United States was _____." What will you do with answers such as "brave," "wealthy," "tall," and "truthful"? "The last name of the first President of the United States was _____."
3. Use good English in the phrasing of all items.
4. Keep the vocabulary within the ability range level of the pupils.
5. Do not copy wording from textbook verbatim. This is called "lifting." To one who really knows, phrasing different from that in textbook will not cover up meanings. Changing the wording discourages textbook memorization.
6. Use type of test item that will measure best the particular aim. Simple recall or completion is best for significant facts; the essay, multiple-choice, situation-response, or problem-solving type is more appropriate for testing relationships, applications, and understandings.
7. Avoid "trick" and "catch" items. "If one ship can cross the Atlantic Ocean in five days, how long will it take two ships to cross?" That is a catch question. Make the relationship between you and the class strictly honest and trustworthy.
8. In completion items have enough content but do not have over two or three blanks at the most.
9. Word true-false statements in the positive even though the positive may be false. "Jefferson was the second President of the United States." This statement is better than saying that Jefferson was not the second President of the United States.

[2] J. G. Read, "Evaluation of High School Science Instruction," *Bulletin of the National Association of Secondary-School Principals*, January, 1953, p. 174.

10. Avoid double negatives. "It is not unlikely that the early pioneers moved westward to better their economic conditions." The more often one reads that statement, the more confused he becomes. Probably it would be better to avoid both double and single negatives.
11. In multiple-choice items it is best to have more than three choices, preferably five.
12. Have all choices in a multiple-choice item possess some degree of reasonableness. The correct choice should come after due reflection and discrimination.
13. In matching items have more possible choices than there are original items. This avoids a correct matching by elimination. If there are five items and five choices, a pupil may know only four, but the last item then is automatically matched with the remaining choice. A score of, say, 8 then forthwith becomes a 10.
14. In essay questions specify what is wanted. This helps pupils to know what is wanted and at the same time will make the grading of the answers more refined. It is better to have more restricted questions than a few vague and indefinite ones. Avoid "discuss," "what about," and "tell all you know about" questions.
15. Make the test a power test. Include items of a wide range from easy to very difficult. Arrange items so that the easiest come first and the most difficult at the end. This range of difficulty will give pupils of different abilities an opportunity to stretch themselves to the utmost.
16. If possible, allow enough time for all pupils to finish or reach the point of diminishing returns. In a power test it is not speed that is important; it is depth that really counts. To dig deep requires time.
17. Give oral or written directions indicating just what you want in the way of answers, how responses are to be shown, whether to guess or not to guess, time to be allowed, if explanations are to be brief or full, etc. If the type of test is not known or familiar to pupils, illustrate on the examination paper or on the blackboard. Allow no noise or interruptions during the examination. At intervals announce quietly how much time is left.
18. See that conditions during the examination are conducive to honesty. It is not honorable to cheat; it is a form of dishonesty. You want the results to be indicative of one's own learning, not his learning plus that of one or more members of the class.

Relationship between teaching and testing.—A class in economics was surprised on the day of the final examination when the professor appeared without a bulging brief case. Was the professor absent-minded? Where were the mimeographed examination sheets? Presently the professor extracted from his

vest pocket a cigar. Surely the professor was absent-minded; he probably thought he was at home in his study. Soon the following was spoken: "This cigar cost me ten cents at the corner drug store; your final examination will consist of a complete answer to this question: 'Why did this cigar cost me ten cents?'"

Was this a good examination? The casual observer may offhand label the test as excellent because it requires organization, the discovery of relationships, the explanation of cause and effect; succintly, it requires thinking. Another observer may brand the test as unjust, incomplete, or tricky. Whether or not the examination is good can be determined only by an analysis of the teaching which went forward in that class from the beginning until the end of the course in economics. If training in analyzing problems of this nature was given during the course, then the question seems fair and inclusive; if, on the contrary, the course was a mere factual course involving no why's or wherefore's, no thinking, no seeing of relationships, then the examination was a test of something not taught for, and was unjust. It is wrong to teach for one thing and then test for something else. So the point, again, looms large: test for what has been taught. Learning goes on before, not during the examination.

Other considerations in construction of examinations.—There are no tricks in the construction of good examinations, but there are guiding ideas which the constructor should heed if he wishes to make suitable tests:

1. *Aims.*—Aims differ; therefore, tests must differ. Some aims are specific and factual in nature; other aims are skills; others are abilities to make applications or see pertinent relationships; many aims take the form of percepts; last, but not least, are the aims of conduct. Facts or definite associations are the easiest to determine by any method of measurement, and too many tests measure only facts. Changes in conduct, appreciation, and attitude are difficult to measure, so difficult that written examinations cannot measure them in a very satisfactory manner.

2. *Selection of most important aims.*—In testing, aims should come first; for this reason, a careful survey of the unit helps in determining the form or forms the examination should take.

Some meditation and reflection should precede the final selection of aims, but, if one has a clear conception of them during teaching, there should be no difficulty in mustering them into accurate relief again. Here it must be emphasized once more that the aims can be no higher than the level of the teacher's concept of them, but this problem has been discussed heretofore. Yet it must be recognized that, if important aims have been stressed, they should be given first consideration in the whole procedure of constructing tests. To select only those products of teaching which fit the possibilities of a true-false type of test defeats the purposes of testing. The aims will, in general, take the forms of memorized materials, percepts, skills, concepts, generalizations, understandings, and evidences of acquired conduct or appreciation. If some or all of these have occupied important places as objectives in teaching, they should occupy that same degree of importance when the construction of tests is under consideration. One should not teach for one thing and test for another.

3. *Activity to be real.*—After the objectives have been selected, the activities to show how well they have been attained need to be selected. By activities is meant the operations pupils are called upon to perform in order to show their degree of mastery, or one might say that the task is primarily the construction of tests which require the responses necessary for proving full grasp of the aims. If, for example, the ability to identify twenty or thirty weeds or flowers or trees has been taught, then the test of this should be the identification of these from genuine specimens or parts of specimens, not merely the listing of the names of twenty or thirty weeds, flowers, or trees. Again, if the ability to speak in public is the aim, then speaking before an audience should be the test, not merely the giving in listed form of a few facts or principles of public speaking. Further, if the ability to write a good paragraph or composition is an aim, then the writing of one in an actual "alone" situation would be the real activity, not the answering of a few fact questions relative to the topic sentence, unity, and coherence. In these illustrations the right test can be distinctly seen, but not all activity can be so easily detected and called into operation through tests; never-

theless, every effort should be made to call into play that activity which shows the highest evidence of attainment of aims. The same idea as the one just developed can be applied to all aims. If the ability to discriminate between the right and wrong of a situation is an aim, if listing of points or names is an aim, if tracing cause and effect is considered important, if developing a topic or problem is thought vital, if explaining is deemed valuable, if discovering the kind and extent of notions and appreciation of conduct is considered significant, then the tests that bring out these aims most clearly and fully are the tests to devise and use. For some of these, one type of test may be best, for others another type may be needed.

Testing for understandings and insights.—It seems reasonable to believe that in life there are times when it is necessary to know, when it is necessary to recall without prompting, when it is obligatory to give the fundamentals without being coached from behind the curtain, and when it is required that one trace and organize some logical development. Instead of so much sampling of subject matter there should be more sampling of the learners. Instead of so much fragmentary testing there should be more examining to discover if some fundamental understanding or insight has been "generated."

If "The Critical Period" can be considered as a unit out of which a fundamental understanding should emerge, then the learner should be given an opportunity to express what the generated concept is. What a wonderful chance that Critical Period affords to the teacher who glories in sampling through dates, men, places, buildings, and memorized fragments of historical development. But one teacher whom the author knows had a different idea of this period and the meaning it should have to her seventh-grade pupils. She demanded a reaction that would show what was within, what was genuinely assimilated, not something prompted from without. Here is a sample of understanding that came from the mind of one pupil:

After the Revolutionary War the thirteen states had many troubles. There were different kinds of troubles. No two states had the same kind of money. Some states almost went to war over trade. There was no power strong enough to make the states obey. If the states wanted to do some-

thing, they did it. A convention was called at Philadelphia to do something about the troubles. Many of the wisest men in the country were at the convention. These men agreed upon certain things that should be done to correct the troubles, and the rules are in the Constitution. The Constitution tells what the states can do and what the federal government can do. It took some hard work before the states decided that the Constitution was good, but they did and soon afterward George Washington became the first president.

This young historian gives, in his brief paragraph, evidence of a keen understanding of the Critical Period, an understanding generated out of causes and effects, an understanding of the motives behind the conduct of human beings. Some teachers might be satisfied with piecemeal sampling of the period, but, to the writer, this paragraph direct from the boy's mind is more enlightening than many true-false statements which suggest and lead the boy to guess what the teacher wants in the way of plus and minus signs.

Tests are means—not ends.—Thus far in this chapter, stress has been placed upon the purposes and the construction of examinations. If one realizes that an examination is only a part of learning and teaching, not a break or a clash with them, there need be no fear that the testing will break down from the absence of a few niceties in the examination procedure. Tests of all kinds are only means to ends. A fundamental conception of the ends will pull in the means as helpers while the ends are being striven for in initiating, promoting, and diagnosing the development of those taught.

MARKS AND MARKING SYSTEMS

After examinations have been given, the results obtained should be employed for some useful purposes; otherwise the time and effort expended cannot be fully justified. Previously in this chapter a few purposes were stressed as most vitally associated with learning and teaching proper. There are other purposes besides these, but, should the ones thus far emphasized be lost, then the value of examinations has shrunk and dried to extremely diminished proportions. In a practical world other purposes must be realized, and to these purposes attention should be given.

Purposes of marks.—The list of major purposes of marks (Table 3), as brought out in the National Survey of Secondary Education monograph, shows the ends served by marks in 258 selected schools. In general, the purposes of marks are to indicate the degree of achievement pupils have made in the subject

TABLE 3*

PURPOSES SERVED BY MARKS IN 258 SCHOOLS

Purpose	Frequency	
	Number	Percentage
1. Keeping parents informed of pupil's progress	244	95
2. Furnishing a basis for promotion	238	92
3. Furnishing a basis for graduation	212	82
4. Motivating pupils	194	75
5. Furnishing a basis for awarding of honors	190	74
6. Furnishing a basis for guidance in the election of subjects	158	61
7. Furnishing a basis for guidance in college recommendation	155	60
8. Furnishing a basis for determining extent of participation in extracurriculum activities	133	52
9. Furnishing a basis for guidance in recommendation for employment	113	44
10. Furnishing a basis for awarding credit for quality	100	39
11. Furnishing a basis for research	50	19

* R. O. Billett, *Provisions for Individual Differences, Marking, and Promotion* (National Survey of Secondary Education, Office of Education, Bull. 17, Monograph 13 [Washington, D.C.: Government Printing Office, 1932]), p. 349.

matter taught. When this degree has been expressed by marks, the marks can be used for various purposes, as in informing parents of a pupil's progress or in furnishing a basis for guidance in the election of subjects. If marks are to serve as bases in determining progress or in furnishing criteria for promotion and graduation, etc., surely a teacher will be called upon to supply such bases; consequently, the next problem is to investigate the plans employed in determining marks.

Plans of marking.—While there are many symbols used to represent marks, in the last analysis these symbols are arbitrary indices of a certain amount of attainment in a specified amount of learning set up as the standard. Without a standard, the indices

of attainment would be meaningless. Of course, this standard itself will vary from teacher to teacher or from school to school, but the mark given to a pupil in a specified subject by a particular teacher must be based upon some standard, and the mark given represents a certain degree of attainment of that standard. The pupils' responses, whether made in oral or written examination, in construction, in manipulation, in drawing, or in other ways, show how well he has progressed toward achievement of the standard expected by the teacher. The standard may take forms such as problems to be solved, reasons to be given, words to be spelled, understandings to be gained, facts to be known, etc. If there are one hundred words to be spelled, the standard is one hundred words correctly spelled; if there are ten essay-type questions to be answered, the standard is the correct or full interpretation of the ten questions. In spelling, the mark can be accurately or objectively determined; in the ten essay questions, the mark may be hard to determine, but determined it must be by as objective grading as is possible. In the grading of compositions there is a standard of achievement, even if that standard is the teacher's personal and subjective criterion. From pupils' responses to the situations cited, or to other situations, the marks given are finally derived; and in each case the marks are based upon the degree of achievement of set standards, regardless of the components of the standards.

Although marks are necessarily indices of attainment, a number of marking systems have been devised to indicate this attainment. In general, the systems fall into two classes: the absolute or the relative. In the absolute system marks indicate numerically the degree to which the standard set up has been attained; the numerical index is an outright expression of attainment as computed upon the basis of 100. Relative systems are comparative in nature, that is, a mark indicates that the pupil receiving it is higher or lower than other pupils in his subject or school; in short, rank or position with others is shown. Information obtained in the National Survey of Secondary Education shows forms in which marks are issued in 258 selected schools:

In four-fifths of the schools marks are issued in the form of letters or equivalent symbols such as Arabic or Roman numerals (see Table 4). In a fourth of the schools percentages are used either alone or in combination with letters or symbols. In a tenth of the schools marks are translated into class ranks. Percentile ranks, written records or logs of pupils' progress, accomplishment quotients, and sigma scores are being used in only a very few schools. The excess of 100 per cent represented in the Table is accounted for by the fact that some schools issue marks in more than a single form.

The 5-point scale predominates in these schools whether marks are expressed as letters, Arabic or Roman numerals, or ranges of percentages.

TABLE 4

FORMS IN WHICH MARKS ARE ISSUED

Form	Frequency		Form	Frequency	
	Number	Percentage		Number	Percentage
Letters or other symbols	210	81	Written records or logs of pupils' progress	4	2
Percentages	67	26	Accomplishment quotients	2	1
Class ranks	25	9	Sigma scores	2	1
Percentile ranks	7	3			

However, scales ranging from 2 points (satisfactory and unsatisfactory) up to the 100 points of the percentage system are represented. Counting minor variations 100 different marking systems are in use in the 258 schools selected for study. Many of these differences are trivial and in their very triviality hard to justify on any other hypothesis than that "there is no accounting for tastes." For example, in one school plus and minus signs are used after all letters on the marking scale; in another school the plus and minus signs apply only to certain letters of the marking scale; in a third school plus and minus signs are not used at all. Or again, in one school the marks preferred are 1, 2, 3, 4, 5, in another school 5, 4, 3, 2, 1 and in a third school, I, II, III, IV, V. Full advantage is being taken in this group of schools of opportunities for variety offered by an almost unrestricted use of the 26 letters of the alphabet; and exponents or subscripts add still greater variety in schools where homogeneous grouping is practiced. One cannot examine the data thoughtfully and escape the impression that rest-

less and often aimless efforts are under way to satisfy needs not at present met by existing marking systems.[3]

Greater clarity might be produced by taking the achievement of a typical class of thirty members and showing how a few common systems of marking operate. Suppose that an examination of 100 possible points was given to this class and that the scores made were as follows: 83, 83, 83, 84, 85, 85, 70, 69, 65, 71, 78, 95, 86, 89, 87, 92, 73, 78, 93, 82, 80, 79, 74, 81, 80, 81, 80, 75, 79, and 64. With these scores as a basis, the first four of the marking systems will be illustrated.

1. *Percentages.*—Nothing further is required in giving marks if the percentage system is used, because the scores as they stand are percentage marks; the pupil who had a score of 95 achieved 95 per cent of the standard, the pupil who had a score of 74 achieved 74 per cent of the standard, etc. Should the examination have 50 possible points, then each score would be multiplied by 2 to derive a percentage mark; if 80, by 1.25; if 125, by 0.80, etc.

2. *Letters or other symbols.*—In this system marks are issued in the form of symbols; the most impelling reason probably is that no such fine distinctions as are implied in the percentage system are possible, especially when the personal or subjective factors enter into the evaluation of pupils' achievement. It must be remembered, however, that achievement, even if expressed in symbols, is reckoned upon achievement as expressed in figures or as expressed in the teacher's subjective standards. If letters or symbols are to mean anything at all, they must indicate achievement to some implied degree. Taking the scores as a beginning-point, it is not difficult to determine the marks in terms of symbols. The marks, for example, are denoted by A, B, C, D, and F; A is the highest, and F is the lowest, division. How shall pupils' marks be determined? Two common methods are employed.

[3] R. O. Billett, *Provisions for Individual Differences, Marking, and Promotion* (National Survey of Secondary Education, Office of Education, Bull. 17, Monograph 13 [Washington, D.C.: Government Printing Office, 1932]), pp. 426–27.

a) One of these methods is based upon the percentage system, that is, scores falling within a certain range shall be A's, scores within another range shall be B's, etc. The percentage range for the school, or one used by an individual teacher, may be as follows:

RANGE IN PER CENT	MARKS
93–100	A
85– 92	B
78– 84	C
70– 77	D
0– 69	F

If a pupil made an 80 in the examination, his mark would be a C because the score falls within the 78–84 range; the pupil who

TABLE 5

PERCENTAGE DISTRIBUTIONS OF MARKS RECOMMENDED TO TEACHERS AS STANDARDS IN 73 SCHOOLS USING A 5-POINT MARKING SYSTEM

MARK	RECOMMENDED PERCENTAGES		NORMAL DISTRIBUTION	MARK	RECOMMENDED PERCENTAGES		NORMAL DISTRIBUTION
	Range	Mean			Range	Mean	
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1 (highest)	2–16	8	7	4	9–46	20	24
2	13–40	21	24	5	1–10	7	7
3	30–60	43	38				

had a score of 64 would get an F because his score falls within the 0–69 range.

b) The second common method is based upon the use of the curve of normal distribution. A quotation from the National Survey of Secondary Education monograph will bring out the essence of this method and also the applications as made in a number of schools:

Definite percentage distributions of marks are usually recommended to teachers in schools where the normal curve is used as a guide. In 73 schools using a 5-point marking scale the mean percentage of marks recommended for each portion of the scale follows rather closely the distribution recommended by Starch when the curve is conceived as extending two and one-half standard deviations on either side of the mean (see Table 5). How-

ever, the range of recommended percentages for any given portion of the scale is strikingly high. For example, in some schools as low as 2 per cent of highest marks are recommended, while in other schools 16 per cent of highest marks are established as standard. In five schools using a 3-point scale the recommended distribution is 20–60–20.[4]

The curve as employed is intended primarily as a guide in the distribution of marks. If individuals were distributed according

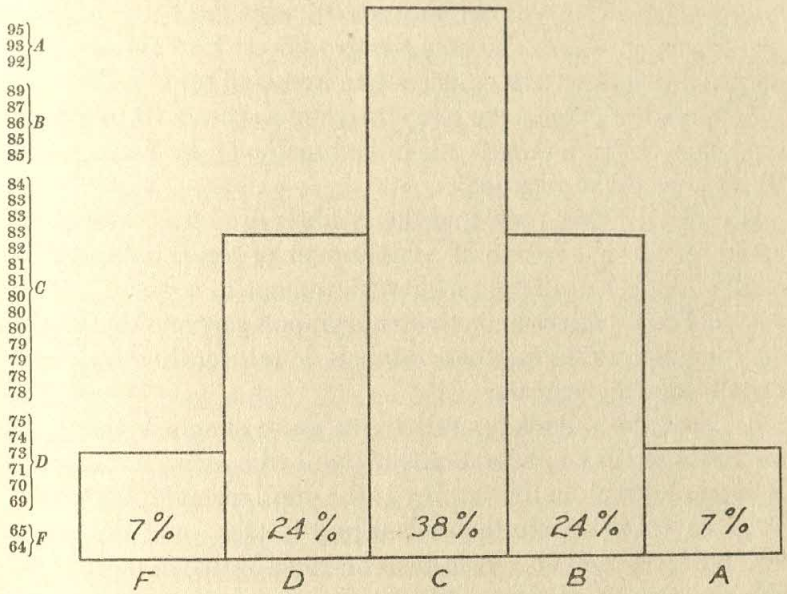


FIG. 12

to ability, one would find a few at the extremes but a gradual increase as the middle is approached from either end. Since marks are indirectly measures of ability, the supposition is that the distribution of A's, B's, etc., should also approximate the normal curve. The graph of the distribution of marks (Fig. 12) shows the five divisions. Each division shows the percentage of A's, B's, etc., to be awarded. The 7–24–38–24–7, the normal distribution, is approximately the average for the 73 schools. Suppose, now, that the class of thirty pupils and their scores are

[4] *Ibid.*, p. 440.

considered again. How many should be given A's? If 7 per cent of the 30 should be awarded A's, that would mean that about 2 or 3 of the pupils should receive A's; 24 per cent of the 30 should be given B's, or about 7 or 8. One might distribute the A's and B's, etc., as shown to the right of the column of numerical scores. How would you have distributed them? As distributed here, about 47 per cent of the pupils are awarded C's, and 10 per cent are given A's. Can you see any reason why the three highest pupils were given A's and only the two lowest F's? Think of the normal distribution as a guide, not an iron-clad rule.

Suppose the percentage range is taken as the basis in giving symbol marks (see range scale in first method), how many A's, B's, etc., would be awarded?

It is clearly seen, now, that the symbols used in marking are based upon some degree of achievement of the standard. If a mark of A does not imply high achievement in a group, and a mark of F low achievement, then the symbols carry no significant meaning; but, as shown, these symbols do restrict their meaning to implied achievement.

3. *Class rank.*—Rank is a relative measure of achievement. In the class used as an illustration, the pupil who secured the score of 95 would be given the number 1: the pupil receiving 93 would be given a 2 to denote the second best in class; and the pupil who made 64 would be given 30 as his rank. If two or more individuals receive the same grade, an average of the two or more ranks is taken as the rank for each one; for example, the two pupils receiving scores of 85 occupy ranks of 7 and 8 and are given an average of 7 plus 8, or a rank of 7.5.

4. *Percentile ranks.*—The percentile-rank method of marking is a relative or comparative measure of achievement. This method is similar to class rank, but in the percentile method the rank is denoted by the group in which one belongs. For example, all pupils in the highest fifth of the group fall into one division, that is, they are at or above the 80 percentile. The next highest fifth is between the 60 percentile and the 80 percentile, while the lowest fifth falls below the 20 percentile. If a pupil is in the highest fifth, then 80 per cent of the group members are below

him in rank; if he is in the lowest fifth, then 80 per cent of the group members are above him. Taking the scores in the class of thirty as an illustration, one finds the six pupils who made scores of 95, 93, 92, 89, 87, and 86 in the highest fifth of the class; the pupils who received scores of 64, 65, 69, 70, 71, and 73 are in the lowest fifth, that is, below the 20 percentile. The marks used to designate ranks may take several forms; the numbers 1, 2, 3, 4, and 5 may indicate the fifths into which pupils fall, the number 1 being the highest fifth; a mark may indicate that a pupil is better than 80, 40 per cent, etc., of his class or group, or vice versa. The percentile-rank system has more than one possibility, depending upon the range of grouping desired. The smaller the range, the finer the distinctions become (Fig. 13).

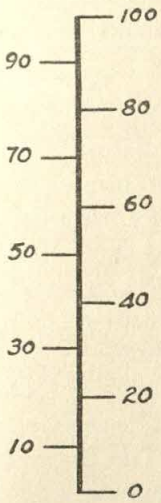


Fig. 13

Common sense to be exercised in giving marks.—In no marking system should the common sense and good judgment of teachers be considered out of order. The systems discussed and illustrated are intended to portray practices that are employed in an attempt to mark more equitably, to secure more equality and universality of marking among different teachers in a school. Another quotation from the National Survey of Secondary Education monograph brings out further pertinent information:

Data for guiding teachers in the awarding of marks in these schools are derived from the literature and from such local studies of failure, promotion, retardation, elimination, distribution of marks, criteria for awarding marks, comparative studies of marking systems, factors influencing marks, and attempts to define marks, as have been touched in section 4. The respondents mention several methods whereby the facts may be made to function in the actual awarding of marks. In more than four-fifths of the schools, individual or group conferences are held on methods of marking. The conferences are most frequently needed for teachers new to the system. More than three-fifths of the schools report that in some of the conferences the distributions of marks awarded by individual teachers and by departments are discussed. More than half the schools report that

printed or typed explanatory material on marking is issued to teachers. In 40 per cent of the schools the normal curve is used as a guide to teachers in the awarding of marks. Many respondents hasten to add, however, that the curve is not forced upon the teachers but is used as an aid to their judgment. A fourth of the respondents state that criteria have been established in each subject as guides to the teachers in the awarding of marks. A few schools report excellent results in the use of objective tests as aids to the teacher who is attempting to award more equitable distribution of marks. In all these respects the larger schools are surpassing the smaller schools.

As stated, only 40 per cent of the respondents from the 258 schools being studied make any use of the normal curve as a guide to teachers in the awarding of marks. Practically all of these respondents report that the normal curve is not used in classes which are small or are known to vary considerably from the normal.[5]

Failure grades.—In marking, the most perplexing and troublesome part pertains to failure grades. No serious complaints from others, no personal pangs of the conscience, arise from the awarding of high or passing grades, but a failure grade may bring resentment from several sources. The Survey findings show that "the median 'lowest mark' (based on replies from 133 schools) accepted for credit in a given course in the school studied is 73 per cent."[6] The passing grade in some schools is above 73 per cent, and in other schools below, but the point at issue is that there is a minimum degree of attainment which must be reached or surpassed before a passing grade is awarded. The Survey shows, quite clearly, that, even in spite of the lowest mark accepted for credit, many adjustments are made and contributing factors considered before pupils are failed, and opportunities are provided for trials and make-up work after pupils have failed to reach the lowest standard set for credit. The teacher's knowledge of a pupil's application, his native ability, his standing on the standardized tests, his chronological age, his regularity of attendance, and similar factors may influence a teacher to pass or not to pass a pupil. In cases of failure, some schools provide trial promotions; other schools allow pupils to continue but to make up work in special classes or after-school hours; still other schools provide time for further study followed by another examination.

[5] *Ibid.*, pp. 438–39.

[6] *Ibid.*, p. 463.

From these instances it can be surmised that, before pupils are failed and after they are failed, every effort is made to insure just consideration of the pupils so affected.

So involved are the problems connected with marking that a prospective teacher, or even an experienced teacher, should receive guidance and assistance from the principal, supervisor, or some other administrative officer. The higher administrative officer should consider it his responsibility to give this assistance.

APPLICATION EXERCISES

1. Testing is really the fulfilment of certain principles of teaching. Which principles are fulfilled by good testing? Explain.
2. In the two multiple-choice items in the problem-solving by Read, you will notice that the one about the bridge has two answers of the five which have much merit: pumping water onto the girders and waiting until the sun goes down. Both answers meet the science involved, but the hidden consideration that the fire trucks might need to cross before sundown shifts the one best answer to pumping water onto the girders. Do you believe that hidden considerations are permissible? If not, how could you change the answers in Read's multiple-choice item so as to make one of the answers best without any hidden consideration?
3. On the basis of 10, what mark would you give a boy who worked the following problem as indicated?

What will 3,840 lbs. of coal cost at $11.50 per ton?
There are 2,000 lbs. in a ton. In 3,840 lbs. there will be

```
        19.2 tons
2000)3840
     2000
     ----
     18400
     18000
     -----
       4000
       4000
       ----
```

If 1 ton costs $11.50, then the coal will cost

```
   $11.50
    19.2
    ----
    2300
  10350
  1150
  -------
$22.0800 (answer)
```

Justify the mark you gave. It is not unusual to get scores ranging from 0 to 10 if several teachers are asked to give their opinions of the worth of the boy's work.

4. The essay examination is generally considered the type of test that lacks objectivity. Why is this? Are there ways to make the essay-type examination more objective? What ways can you suggest?
5. Under what circumstances would you say the essay-type examination is the best one to employ? Why?
6. If tests, diagnostic included, do not test for, let us say, understandings and insights, how is it possible to tell whether pupils have understandings and insights? If the main use of tests is for diagnostic purposes, then what value have tests which do not measure the really worthwhile objectives?
7. How can the activity in testing be real, as, for example, in physical education, home economics, music, mathematics, science, and English?
8. During a semester a teacher gives five one-hour examinations. Is there any way she might determine, in a general way, the reliability of the examinations?
9. Why is it inadvisable to use the normal curve in giving marks to a small class? Would it be unwise to employ the percentile system in giving grades to a small class? Could the percentile system be used to show the relative standings of the graduates for a particular year in a large high school?
10. Does the fact that a person has a high-school diploma enable you to know much about the person? Some colleges and universities will admit only high-school graduates who are in the upper quarter, the upper two-fifths, etc., of their class. Do you see any reason for such requirements?
11. Should pupils fail in high school? Some high schools do not fail pupils. Why penalize pupils because they are not so gifted as some other pupils? Why should not a pupil who has spent the required number of years in high school get a diploma?
12. Give several improvements you think should be made in testing and in marking in secondary schools.

RELATED READINGS

Bossing, N. L. *Teaching in Secondary Schools*, chap. ix. 3d ed. Boston: Houghton Mifflin Co., 1952.

Burton, W. H. *The Guidance of Learning Activities*, chaps. xix and xxi. 2d ed. New York: Appleton-Century-Crofts, Inc., 1952.

Douglass, H. R., and Mills, H. H. *Teaching in High School*, chaps. xx–xxi. New York: Ronald Press Co., 1948.

Goetting, M. L. *Teaching in the Secondary School*, chaps. xiv and xix. New York: Prentice-Hall, Inc., 1942.

Greene, H. A.; Jorgensen, A. N.; and Gerberich, J. R. *Measurement*

and Evaluation in the Secondary School. New York: Longmans, Green & Co., 1943.

NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. *The Measurement of Understanding: Forty-fifth Yearbook,* Part I. Chicago: University of Chicago Press, 1946.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools,* chaps. xxvii–xxviii. Rev. ed. New York: American Book Co., 1947.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools,* chap. xiv. New York: Appleton-Century-Crofts, Inc., 1948.

ROSS, C. C. *Measurement in Today's Schools.* 2d ed. New York: Prentice-Hall, Inc., 1947.

STILES, L. J., and DORSEY, M. F. *Democratic Teaching in Secondary Schools,* chap. x. Chicago: J. B. Lippincott Co., 1950.

THUT, I. N., and GERBERICH, J. R. *Foundations of Method for Secondary Schools,* chaps. v, viii, xi, and xiv. New York: McGraw-Hill Book Co., 1949.

TIEGS, E. W. *Tests and Measurements in the Improvement of Learning,* chaps. ix–x. Boston: Houghton Mifflin Co., 1939.

TRAVERS, R. M. *How To Make Achievement Tests.* New York: Odyssey Press, 1950.

WRINKLE, W. L. *Improving Marking and Reporting Practices,* chaps. vi–vii. New York: Rinehart & Co., 1947.

CHAPTER XIX

PLANNING THE TEACHING

EVENTUALLY a time comes in the preparation for teaching when one must meet his pupils, not in imagination, but face to face. This occurrence is not different from that found in other situations requiring skill and social contact: eventually the minister meets a real congregation; the singer, a waiting audience; the radio star, his unseen but eager listeners; and the debater, his assembly to be convinced. In each of these instances requiring performance before individuals, successful performance is always based upon careful preparation. During the real performance it is difficult to imagine any one of these performers rising to heights more lofty than the heights reached in preparation, but it is logical to conclude that, the higher the levels of performance reached in preparation, the higher the levels of later performance will be. Generally speaking, one might say that any satisfactory performance in teaching, or in any other of the higher occupations, is made possible by long and arduous training and study, and not by sweeping and inspirational soaring on the spur of the moment.

Planning necessary.—Planning is one of the necessary preliminary activities which prepare the instructor to fulfil better the responsibilities met during actual teaching. The law of self-activity applies equally as well to the learning of the teacher as it does to the learning of pupils, and the planning of teaching is a profitable and necessary exercise of the law as applied to preparation for effective instruction. If the work in all class periods were invariable, then a high-grade solution could be worked out once and applied to every subsequent period; but such solution is impossible, because innumerable variables are confronted in subsequent class instruction, chief among these being different aims, new materials of a subject, individual differences among pupils, types of learning involved, and concepts of philosophy

and psychology gained or changed in the teacher's growth from day to day. A static classroom environment cannot be assumed, and any assumption in that direction would be unwise and detrimental.

The testimony of good teachers leads to the conclusion that the best guaranty of effective procedures during instruction is careful planning before instruction. Probably more ideas are gained in the silent and reflective activity before class than are ever gained during the busy and demanding class-time activity. At any rate, the pre-teaching reflection gives direction and balance which are necessary in spite of all the natural and spontaneous alertness possessed by the keenest of individuals. Pupils are entitled to the best that their guides can give; and, should that giving be impaired by lack of preparation for giving, then a wrong has been done to innocent youngsters.

Routine motions not the fundamentals.—In preparation at teacher-training institutions, during practice teaching, and during regular teaching, an enormous amount of stress and emphasis has centered upon lesson plans and upon the techniques and halos and dimensions and rules governing their construction. Surely, one would be led to believe that something mysterious and supernatural dwelt within a plan produced according to inexorable rules and regulations. The plan, it was supposed, would make good teaching; it would pull in the best procedures; it was the instrument par excellence for deriving insight and understanding of the teaching act. Lesson plans, if precisely and frequently made, would insure the inculcation of the art of teaching in anyone. Repetiton was the watchword and the guiding pedagogy. So there emerged the double column, the single column, the divisions and their sequence, the specific number of questions, and the other irreducible techniques. Standardization had set in. In some training institutions prospective teachers made plans continuously throughout their courses in methods. Even in regular high-school positions capable teachers were required to hand in detailed plans for every class period taught. Lesson plans made good teachers; lesson plans insured good teaching.

The shortcoming suggested in the preceding paragraph—

namely, the endeavor to develop mastery of a fundamental and profound work by requiring repetition of handed-down rules of procedure—has permeated too frequently and deeply into the preparation and the supervision of teachers. An analogy will portray the idea more vividly and accurately. Let us suppose that an ideal aim is to develop some person until he has the necessary abilities of a good automobile mechanic, until he actually understands the working of an automobile. We give him lessons in driving, many lessons; he steps on the starter, shifts gears, presses the brake, shuts off the motor, turns the lights on and off, and reads the gasoline gauge; he drives, he parks, he runs the car into the garage; he is given many trials, he does well, he surely now understands an automobile and its fundamental operations. Well, our would-be mechanic is in reality merely a routine worker; he knows little of the ignition system, the lubrication system, the cooling system, the motor, the transmission, or gears; he cannot diagnose or repair or adjust in case of difficulty; he has never lifted the hood, and he knows nothing of the intricacies under it; he is drilled in the externals and routine activities, not in the important and essential powers and potentialities hidden within that machine. So, too, in lesson-planning, the external and routine actions are often depended upon to give mastery of teaching, while little or no time is devoted to the development of the internal powers and insights which really give a significant grasp of instruction. In short, a real lesson plan is a creation of a mind surcharged with ideas and understandings; the lesson plan cannot be used to surcharge the mind with ideas and understandings. Teachers with a background are equipped to make plans, but making plans cannot give teachers a background. Succintly stated, teachers make plans, plans do not make teachers.

THE FUNDAMENTALS IN PLANNING

Before plans can be drawn up with any degree of perfection, a basis from which the plans emerge needs to be created; otherwise, the plans become products lacking depth and substance. Throughout this book an endeavor has been made to establish a basis with the best ideas and principles of teaching and learning,

and it is from this basis that the plans are to be derived. Without a basis no satisfactory teaching can come forth; and, to make clear what is meant by a basis, we shall examine the teaching and learning arising from two actual classroom lessons in the measurement of lumber:

Lesson 1.—In the first lesson, pupils learn the abstract definition of a board foot; they are given a rule for finding the board feet in pieces of lumber: length in feet times width in feet, times thickness in inches; a number of examples from the textbook are worked and the answers checked; if errors are discovered, pupils are told to watch their reductions (8 inches equals 2/3 of a foot) and multiplication and division; finding the cost at so many dollars per thousand feet ends the study of lumber.

Lesson 2.—In the second lesson, the same pupils are taught by the principal after the study of lumber has been completed in Lesson 1. "Will you take a piece of chalk and sketch on the floor what you think would be one board foot of lumber? What, in terms of lumber, do we mean by a two-by-four? (No one knew.) Fred, will you go down and ask Mr. Hassell for a piece of two-by-four? Tell him I want it. Did you ever see a board foot of lumber? (No one had.) Charles, go down and tell Mr. Hassell that I want two boards each six inches wide and also a piece of two-by-six. Tell him the pieces should be three or four feet long. He will know what you want.

In the meantime, the mark on the floor is examined, and it is found to be about 6 inches square. "If you went to the store and said, 'I want potatoes,' what would the storekeeper ask you?" No hesitation here; the pupils say that he would want to know how many pounds or pecks. The pupils see the point in buying ribbon, gasoline, oranges, and butter. Quantity is designated by yards, gallons, dozens, pounds. "What of lumber? We must have an expression which tells how much lumber we want. What is it?" A feeble response of "board feet" is heard.

By and by the boys return with the lumber. "I place these two boards, each 6 inches wide, side by side. Come up, anyone, and with a piece of chalk mark off a board foot." It is done correctly by a pupil after a few trials. "How much lumber is there in the part marked off?" Answer by pupils: One board foot. "Now, what is meant by a board foot?" Answer: 1 square foot of lumber is a board foot. "Suppose these boards were 2 inches thick, would there still be 1 board foot?" Pupils hestitate now, but feebly suggest that there would be twice as much wood because the boards are twice as thick. "Examine this two-by-six and this board 6 inches wide. Would it be right to consider only the surface in finding the actual amount of wood in each?" Pupils discover that thickness makes a difference. "Examine this two-by-four. How many board feet would there be in a piece cut off 1 foot from the end?" Pupils finally agree that there would be 2/3 of a board foot. "This board is 6 inches wide and 4 feet long. How many board feet are there in it?" Pupils get 2 board feet as the answer. "This piece is 6 inches wide and 2 inches thick. How many board feet are there in it?" The correct answer is derived. "If you see just the flat surface of a board,

how do you go about finding the board feet?" Answer: Find the area in square feet. "What do you do when you know the thickness of a piece?" Answer: Multiply the area in the surface by the number of inches in the thickness.

At this time a yardstick is held flat by two boys, one boy at each end, and a weight is tied to the middle of the stick; the stick sags quite noticeably. It is then held with the edges in the same vertical plane, the same weight is tied to the middle, and the stick does not sag. Pupils volunteer to examine the attics and basements of their homes to discover the shapes of the lumber used and why certain shapes are used in different places.

"What is matched lumber and why is it matched? Do all kinds of lumber cost the same? Why? Why does flooring generally come matched? What kind of wood is used in flooring? In roof boards? Why?"

There is solving of problems relative to board feet in the pieces of lumber in the classroom, and the board feet required to put a floor in the classroom. Some textbook problems are worked out and others assigned. Pupils are promised that various sizes and kinds of lumber will be available for examination in the classroom that evening and the following day. George volunteers to get some information about prices and uses of lumber from his father, who is a lumber dealer.

These two lessons depict teaching that took place from the viewpoint of an observer who did not have an opportunity to see the plans from which the teaching emerged, but no great strain of imagination is necessary to visualize the substance of the two plans. Whatever substance there is, be it weak or strong, comes from minds; if the substance be weak or strong, the mind from which the plan emerges is responsible for that weakness or strength. The plan cannot reach a greater degree of worth than the worth of the ideas and understandings supporting it. In the last analysis, a plan is pre-teaching; and all the resources of a teacher are recalled, examined, evaluated, and arranged during pre-teaching to insure the best possible actual teaching. Should the resources be limited, the pre-teaching will be limited; likewise, the actual teaching will be limited. While a plan, therefore, is very beneficial, it cannot in any case rise higher than the planner's ability to recall, evaluate, and arrange the best in his resources. A plan can make certain only that the background resources have been examined and the best ones brought into the pre-teaching preparation.

What, then, are the resources in a teacher's mind that should be utilized to their maximum in pre-teaching? The answer to

this question is in reality the planning of teaching itself. The development of the answer to this question is now of major importance.

1. *Objectives.*—First among the resources that should be utilized to their highest in the pre-teaching preparation are the objectives. No learning can be considered well directed unless the energy spent in learning is centered upon aims of the highest value; and planning should be concerned with them first. A brief examination of the aims in the two illustrations of measurement of lumber brings out the differences as shown below:

Lesson 1	Lesson 2
To give abstract definition of a board foot	To learn and define what a board foot is from actual contact with lumber
To memorize a rule for finding board feet	To see, feel, and otherwise come in contact with different pieces of lumber
To work problems according to the rule	To learn the names of these pieces
To find cost of lumber	To learn how to find the board feet in these pieces of lumber by reasoning out a way from the background gained from contact with lumber
	To know why lumber comes in different sizes and dimensions
	To learn from observation where and why these pieces are used in certain constructions
	To learn a few reasons why different kinds of wood are used for certain purposes
	To work some problems of a practical nature
	To find the cost of lumber
	To find out why some lumber costs more than other kinds and the actual cost of a few different kinds

We should pause here to determine the differences between the two sets of aims and the causes for the differences. The first set is characterized by memorization of a rule and the mechanical use of that rule. The second set has percepts of lumber; discovery of a way to find board feet by reasoning out a way, from direct experience with lumber; solution of practical problems; and uses, kinds, and costs of lumber. In searching for causes behind

these differences, there are but two places to go, and those places are the minds of the two instructors. One mind was lacking in a knowledge of high aims; the other was surcharged with high aims. In one pre-teaching preparation high aims were selected, and these aims appeared later in actual teaching; in the other pre-teaching preparation high aims were not selected, and, of course, they did not appear later in actual teaching. The causes of the presence or absence of most worth-while aims, then, are differences in resources to draw upon. The quality of the aims is directly proportional to the quality of the resources. Planning, then, utilizes the resources actually present; it brings out the best from them. These two processes are very beneficial because they go far to insure the best possible utilization of present resources.

Planning objectives for a course or subject.—The aims thus far brought out are daily or specific aims; they can be attained in one day or are so reduced that they are ready for specific teaching purposes. If we set up an aim such as to have pupils gain the ability to make some common measurements, it would be more general, the specific measurements being concealed. In planning, the daily or specific aims must be decided upon before learning can be directed, because it is impossible to learn the whole of anything thoroughly without covering the specific parts comprising the whole. In the last analysis, the daily aims have been refined to such a degree that learning and teaching can proceed with restricted and limited ends in view.

Before the daily aims are selected, another reduction process of larger scope should be completed. In this process a large view of the course or subject should come into planning as the first major activity; a view which takes in the general understandings of the course for a semester or a year. There are too many instructors who see only the work for a day or two; these persons need a long vision of the work to be undertaken in a period of time, as in a semester or in the completion of a subject. With the whole course in mind, the planning should work backward until such reductions have been made as are found in the specific or daily aims previously illustrated. The first reduction in this backward planning will not be the daily aims, but it will be the determination of suitable understandings of divisions or units of

the subject. Lumber measurements, for example, would fall within a unit comprising many other measurements, and the unit might be called "measurement," "common measurements," or "practical measurements." After the determination of units and the basic understandings in each unit have been planned, there follows the determination of the specific percepts, skills, ideas, appreciations, and understandings which enter into the mastery of the unit; at this stage the planning can be reduced to such a degree that the specific aims emerge, such as were brought out in the list under lumber measurement. The same shifts here illustrated apply with equal vigor to planning in whatever is or may be taught in the secondary-school curriculum—the procedure holds, regardless of the applications to which it may be put. Planning then, has the forward and backward movements; the former encompasses the flow of thought from the daily aims to the building of basic understanding in units and in whole courses; the latter works backward from a large structure or school subject until the specific objectives which eventually compose the large structure or subject are selected. Both these movements finally culminate in a single purpose: the determination of aims, general and specific. In planning, therefore, one marshals and evaluates all that he has by way of resources so that no stone will be left unturned in the discovery of objectives of the highest value. Unless the objectives are brought to the surface in planning, there is little hope that they will somehow appear by magic during actual teaching.

2. *Learning activities.*—Second among the resources that should be utilized to their highest degree in planning are those which pertain to the activities in learning which lead to the best attainment of the aims. All that the planner has in his resources pertaining to psychologically sound self-activity, types of learning, and principles of learning will be extremely helpful in determining the most valuable learning activities to bring into operation. It can be stated again that the learning activities selected cannot be of higher quality than the quality of the ideas in the mind from which they are selected. Resources utilized can be only those resources present.

By using the lesson in measurement of lumber as an illustration, the utilizing of the appropriate learning activity in planning can be better comprehended. Since the aims are not alike in both lessons, a supposition must be made so that the aims shall remain constant; hence, we shall assume that this one aim is constant: To learn how to find the board feet in specified pieces of lumber. A portion of each plan then will appear as shown below:

LESSON 1

Aim:

To learn how to find board feet in specified pieces of lumber

Procedure:

Give pupils definition of a board foot

Give the rule for finding board feet: L in ft. $\times$ W in ft. $\times$ T in inches

Work a problem on board to show pupils how rule works: How many board feet are there in a board 16 ft. long, 4 in. wide, and 1 in. thick? $16 \times \frac{4}{3} \times 1 = 5\frac{1}{3}$.

Review rule

Assign problems in textbook, pupils to work as many of these as possible during remainder of period

LESSON 2

Aim:

To learn how to find board feet in specified pieces of lumber

Procedure:

Develop idea that a board foot is unit of measurement in lumber. Use apperception—have pupils see units in other measurements, as quart, peck, pound, yard, dozen

Develop percept of a real board foot by drawing off a square foot of lumber upon two boards, side by side, each 6 in. wide and 1 in. thick

Using a two-by-six, develop idea of thickness as a factor in lumber measurement. The surface of a two-by-six foot in length has ½ sq. ft. of surface area, but the 2 inches in thickness actually give an amount of lumber 1 sq. ft. by 1 in. thick, or a whole board foot

Further develop by using two-by-four in the same manner

By inductive reasoning, have pupils find a way to determine board feet in any piece of lumber: sq. ft. in surface $\times$ thickness in inches. No rule is required to be memorized —understanding how to do it is the aim

Find board feet in specified pieces of lumber

Further development of concepts by actual contacts with lumber placed in classroom

Lesson 1 and Lesson 2 show a striking contrast in activities selected to guide learning during attainment of the aim. While proof for the superior merit of activities in Lesson 2 would not be difficult to find, the purpose here consists in portraying the composition of planned teaching, and among the most important parts of planned instruction is that part consisting of the activities selected to attain the aims. At no time during preparation for the actual teaching will thinking and evaluating reach a more critical stage than during the time effort is devoted to the selection of efficient activities, for in a real sense the teaching depends upon a wise direction of learning for its effectiveness. If Lesson 2 is superior in the choice of activities, then some thinking and evaluating are responsible for the selection of more influential learning exercises, and the resources possessed by the mind back of Lesson 2 must have been more abundant or more conscientiously and discriminatingly drawn upon. Be the causes what they may, the fact is that planning can and does exert a pressure upon one's resources so that these resources are drawn upon to their limit in the choice of best activities to bring into operation while teaching for the chosen aims.

The activities planned are in reality those mental or physical operations which pupils employ. Now, these operations are set in motion by the teacher, that is, she sets up situations which require the operations she thinks should be employed. At times questions are used to stimulate the right activity; certain manipulations may be set in motion; sensory experiencing may be fostered (as in measurement of lumber); experiences may be recalled; experiments may be performed; problems may be set; inductive and deductive reasoning may be demanded; etc. The activities stimulated take different forms when incorporated into a plan. The purpose of the activity and its effectiveness are, of course, first determined, and then the questions, problems, sensory materials, etc., are incorporated to bring about the desired activity.

3. *Assignment.*—Another resource drawn upon in planning is that one supporting an understanding of the assignment. Since the assignment has been treated heretofore, no further discus-

sion is needed except the reminder that a good assignment is an important phase of instruction requiring attention in pre-teaching preparation.

A complete plan.—The aims, the learning activities, and the assignment constitute the three developments during the planning. When the three are written out, the common term chosen to name the product is "lesson plan." Of course, a plan in the broadest meaning may be considered any contemplated course to be pursued during teaching, and it may be unwritten; but, as used here, a plan shall be regarded as a representation so concrete that any person can read the contents and know quite well the instruction intended by the planner.

THINKING THROUGH A PLAN FOR TEACHING SAFETY EDUCATION IN THE HOME

We shall begin by planning instruction in an area of living that will find a place in the lives of young persons in our schools. In this case a start can be made by noting that accidents cause now and will continue to cause trouble as long as one lives. To restrict the area somewhat so that planning can be held within limits in this broad area, that part dealing with accidents in the home will be illustrated. It is known that there are almost as many deaths caused by accidents in and around the home as there are deaths resulting from motor vehicle accidents on the streets and highways where muscular control and reflex action are stretched to nervous and emotional heights. Around the home, on the other hand, this demand upon the nervous system to strain and watch and be constantly on the alert is not present, yet nearly as many deaths occur right there in homes where life is supposed to be at ease, carefree, and tensionless. Surely, then, a study of home accidents is somewhat different from a study of automobile casualties.

Search for objectives.—The first phase of planning could be a survey of the kinds of accidents that occur in homes. Following closely, the causes of the accidents could be determined. A further breakdown of the accidents according to ages would be useful. These facts are objectives in a sense, informational

objectives. Should the search for objectives stop at this point after the informational aims have been examined and memorized? Unfortunately, in many instances the planning and learning do cease at this point. Are the aims so far mentioned most worth while? Can it be that knowledge or information automatically produces changes in behavior? Findings from the psychology of learning experiments will give us a negative answer. If the mere knowing of facts produced the changes in behavior sufficient to eliminate or greatly reduce accidents in the home, then teaching would certainly be a simple and sure-fire operation. This assumption just won't hold water.

In the search for more appropriate aims, a deeper interpretation of what a change in behavior means must be gained. Knowing the facts is a link, no doubt, in the chain of learning that leads to more significant behavior, but it is the significant behavior that is not clear as an objective. Will the pupils really be filled with a determination to be safety-conscious? Will they put their shoulders to the wheel in making their homes safer places in which to live? Will they truly and purposefully do everything within their power personally to take a hand in increasing safety? Will they make a firsthand study of the danger spots in their homes? Will they get out the paint brush and the hammer and take a hand in fixing some of these danger spots? Will they avoid pranks that might cause an accident? Do they feel within that good citizenship starts with the common and everyday activities around the home and that a good citizen must do more than vote? What is urgently advised here is that the teacher think of behavior that actually has *action* in it. Lip service will not do; the inner urges to do something, to be careful, to carry responsibility, to correct the situation at home, to foresee consequences of neglect, to use good judgment, and to "lock the door before the horse is stolen" are paramount. "The life you save may be your own."

An appropriate list of objectives would contain at least the following:

1. Knowledge of the number of accidents, deaths, and probable cost to the country

2. Causes of these accidents and deaths
3. To feel that making and keeping the home safe is a civic responsibility of young and old
4. To be determined to do all within one's power to keep the home safe for self and others
5. To be concerned enough to study home conditions for the purpose of discovering danger points
6. To be inspired enough to correct danger spots or conditions around the home
7. To be conscious of one's part in the causing of accidents to others
8. To use judgment in foretelling what young children, because of their lack of knowledge or experience, will do that causes harm to the human body
9. To be alert and keep prevention uppermost in one's mind

It can be detected in this list that *action* enters to a large degree and rightly so, because, after all, accidents will never be prevented until something is done about them.

Learning activities that will produce within human beings these developments should be the next phase in planning. This leads directly into the way learning takes place.

Direction of learning.—Without paying attention to any particular sequence at this time, a list of possible learning experiences that might be used to attain the aims will be the next logical step in planning:

1. Have pupils read printed materials containing number and kinds of accidents in the United States.
2. Read about the number of deaths from accidents in the homes of this nation.
3. Read about the causes of different kinds of accidents.
4. Read about the ways to prevent various kinds of accidents.
5. Examine newspapers to find accounts of accidents in homes.
6. Ask pupils to question their parents about accidents that happened while the parents were bringing up the families.
7. Ask the parents just what caused the accidents.
8. Have these accidents listed and frequencies found.
9. Have a committee of three pupils interview a doctor in the community and find out what accidents he found in his career as a physician.
10. Have a doctor come to the school and talk about accidents.
11. Have the pupils make studies of their own homes to discover danger points.
12. Have them figure out what could be done to correct these places or conditions.
13. Have them do as much as possible themselves to correct or remedy

these points of danger. (Co-operation of parents may be necessary in some cases.)

14. Make a study of why young children do dangerous things around the home, such as pulling on the handle of a pan of boiling soup while mother is answering the telephone.
15. Show a good movie depicting accidents in the home and the consequences.
16. Have pupils paint posters showing the right and the wrong ways and have posters put up in the classroom.
17. Put on demonstrations in the classroom showing what should not be done, such as using a chair with books piled on it for a step-ladder.
18. Read stories of serious accidents and why they were caused.
19. Read stories with a moral, as "I Didn't Know the Gun Was Loaded."
20. Have pupils tell of accidents that happened to them and why.

Thus far the planning has been done outside of the class period by the teacher. It is that preliminary planning in which much thinking is done about life and what is demanded of a person who lives in our society. The planning has been narrowed down now to an ultimate objective: one should be able to maintain health and physical fitness. In addition, a phase of that broad area has been selected as worthy of consideration in the lives of young pupils, namely, health and physical fitness can be maintained by learning to avoid accidents in and around one's own home. Further, the objectives of this part of safety education have been selected carefully as well as the learning experiences that lead to the attainment of these objectives.

Choice of procedure.—Planning has reached that stage now where a choice can be made between developing the work on the daily basis or on the unit idea. This does not mean that the substance of the development must be entirely different if one or the other plan is chosen. As the unit procedure was treated in a previous chapter, it may be preferable to teach safety education in the home on the daily developmental plan for the purpose of illustrating the daily assignment procedure in greater detail than was brought out in the chapters dealing with the assignment and the question-and-answer method.

Planning the approach.—A good approach or introduction to the study of safety in the home is significant because the attitude and interest and concern of the pupils will determine in large measure what effort they will make to attain the aims

desired by the teacher. The writer has often had his students in method courses try to devise approaches to this same topic. Every approach had elements good and worthy. No two approaches were ever the same in all respects. It is good that prospective teachers have different but good ideas. An example of one of these approaches went as follows:

This particular student went to the blackboard and drew a horizontal line about a yard long and then said that the line represented one minute of time. He took out his watch and said that every so often during a minute he would put some short vertical lines along the line that stood for one minute. He glanced at his watch and put down a vertical line; some seconds later he put down another vertical line; he had seven lines vertical to the horizontal line when the minute was over. He then asked the class what they thought the vertical lines meant. Of course, much guessing ensued, but also much curiosity and interest were aroused. Finally, he told them that each line stood for a newly born baby in the United States. In other words, during the minute seven babies were born. He also went on to say that during the very class hour about three hundred and fifty babies would be born. These would be new additions to our population. He said that he hoped all of them would be ready for junior high school in about twelve years from now. He asked the class if they thought all three hundred and fifty would be on hand for the first day of school twelve years hence. The answers given in the negative revealed some information that he used later in his discussion.

Next, he drew another line on the blackboard which was to represent one minute of time. During the next minute he put down one vertical line, then another, and, near the end of the minute, a third line. As usual, there was guessing, but one member of the class could not be denied this time; she said that the lines meant that three persons had died or gone ot the great beyond during the minute. She was right. The student illustrating his approach then went on to say that, during the very hour the class met, about a hundred and fifty individuals would disappear from the scene in the United States.

Concluding, he recalled the responses of the members who said that not all of the three hundred and fifty babies would answer the call when junior high schools opened in a September twelve years from now. Why wouldn't all of them be there? Several reasons were given, accidental deaths being among them. The student gave some information concerning accidents. A large city newspaper reported that last year 22 polio deaths occurred in the city but that during the same year 254 children under fifteen died as a result of accidents. Accidents are responsible for more deaths in the one to five age group than are all communicable diseases combined. In three and one-half years of World War II, over 300,000 of our armed forces were killed or missing. During the same time more than that many were killed by accidents in the United States, and about one-third, or 118,000, were killed right at

home. Can't we do something about these home accidents so that we and members of our families may be spared serious injuries and needless deaths?

Planning the daily and cumulative development.—After this preliminary planning and the making of a dynamic approach, the next logical step needs examination. All subject matter should be brought as close as possible to the very existence of the pupils. How can teaching bring safety education right into the very lives of the learners? Would it not be wise to use the community and the homes first as real sources to investigate? Psychologically, facts and information, although impressive in themselves as found in books and other publications, will mean more if some basis for the knowledge is gained at first hand in the immediate environment. How serious is the maintenance of health and physical fitness in the lives of these pupils at this very moment? A start could be made by investigating on the home ground. What accidents have occurred right in their own homes within the past few years? What caused these accidents? How many class members have been in accidents in their own homes? Surely, the first day or two might be devoted to the aims as just brought out. Immediately the learning activities leading to the realization of these aims are involved.

If one were planning a lesson, he would sketch in writing so that a training teacher or a supervisor would get an idea of his procedure before the actual teaching was done. Such a written sketch is called a lesson plan. Let us assume that this plan is a daily one. It would appear somewhat like the following:

ASSIGNMENT

Aims	*Learning Activities*
To make pupils aware of the accidents that have occurred in their own homes to them and to others in the family.	Have each pupil find out from his parents what accidents other members of the family have had. Have each pupil tell about accidents that have happened to him.
To find out the reasons why these accidents happened.	Have Harry interview his father, the town doctor, and bring back to the class some general information concerning accidents in the community.

DEVELOPMENT ON SECOND DAY

Aims	*Learning Activities*
Same as on preceding day	Have pupils relate accidents that other members of the family had.
	List kinds and frequency of these accidents on blackboard.
	Have pupils tell of accidents they had and make a list of kinds and frequency.
	Have Harry give general conclusions about accidents gained from interview with his father.
	As pupils relate the causes of accidents that happened to other members of the family or to themselves, make a frequency table of the causes.
	Summarize and stress the kinds of accidents and the causes as discovered in their own homes and community.

During the remainder of the time devoted to the enlargement of safety education in the home, the work will include other aims and other psychologically sound learning activities. Probably the study of accidents and their causes on a national scale would follow as the assignment for the third day. The activities involved here would be reading of books, bulletins, pamphlets, and other printed materials. Publications of the Bureau of Vital Statistics and the National Safety Council contain recent and vital information. This reading will now mean more to pupils because they have been doing some gathering and classifying of similar data gleaned from homes and community so close to their everyday existence. Their understanding and appreciation of home and community statistics will help them immensely in doing the same with information of national scope.

One of the objectives mentioned earlier was the desire and determination to do something concrete to help out in the endeavor to prevent accidents from happening to themselves and others near and dear to them. What learning activities would bring this aim to full realization? From the standpoint of learning, it seems reasonable to believe that doing something about it now is the best way to be sure that the aim will carry

over and become a deep and permanent development. Surely, somewhere in the treatment of safety education in the home, pupils should go into their homes and look for dangerous places; they should do everything within their power to correct them; they should watch their behavior and refrain from running and leaping down stairways; they should tighten loose boards and brace wobbly chairs and stepladders; and they should correct all conditions that might result in accidents. Probably some guard rails could be constructed on dangerous stairways. This brings up the matter of getting parents to lend a helping hand in correcting danger spots too difficult for pupils to undertake. In this case, pupils can play a part in bringing the literature on safety education into their homes so that parents, too, become aware of their part in the prevention of accidents. Most parents will believe more in the benefits of education if they realize what the schools are trying to do for their children; the parents will see the importance of safety and will co-operate to make their homes safe for children as well as for themselves.

The preceding paragraph was written to direct attention to learning activities. Those brought out go beyond those harmless and often profitless ones of memorizing a few facts and then giving them back in a test; the ones given call into play activities actually involved in doing something about conditions; they give pupils that initial momentum that should grow more powerful as these young persons live and play and work in one place responsible for many accidents to old and young alike—the home.

This study of safety education in the home could well be developed by considerable teacher-pupil planning as the work continues as contrasted with the teacher-prepared mimeographed procedure shown for the unit on the Critical Period in chapter x. Pupils have some good ideas about sequence and also about learning. Part of the time in each class period could be spent in looking at the next phase to be undertaken and what should be accomplished. Both teacher and pupils need to co-operate in planing the work. Their efforts finally combine to produce that planning which is beneficial for the teacher as well as the pupils.

THE PRINCIPLES OF TEACHING AS FUNDAMENTAL GUIDES

A plan is not worked out along mechanical lines; it involves the very best that one knows about objectives, the psychology of learning, and the principles of teaching. It is the end product that comes after you have learned the fundamentals supporting efficient classroom instruction. Your plan can never be better than your resources. Your plan will be a good indication of the understanding you have of teaching.

If the planning extends to units or any unified area of learning, the fundamentals are essentially the same. We are often inclined to believe that teaching by means of units, projects, problems, or some other ways must always imply a difference in the fundamentals of teaching. In reality the fundamentals are the same in daily plans as well as in any plans regardless of their length or destination. In short, the planning of a lesson one day or period in length should be just as genuine as the planning of a unit that may take several weeks to develop. Although the application of the fundamentals may vary, the fundamentals are always present.

In the Preface it was stated that this book had for its purposes the development of an understanding of the principles of teaching and the utilization of means leading to the fulfilment of these principles. You are now in a position to judge whether these principles do constitute the fundamental guides in teaching and whether you understand them reasonably well. It is not expected even now that you understand them fully or that you are able to use skilfully and artfully all the means necessary to fulfil these principles completely. It is hoped, however, that you can make a strong start and that you will develop more power as you teach from day to day. Your studies and readings and investigations will make you more alert to and aware of the objectives of most worth; you will discover that you cannot learn for pupils but that you can guide their self-activity into proper channels; your assignments as means will improve so that unity is increased, motivation enhanced, and provisions for individual differences pro-

vided; the questions you use will become better and better as means to obtain the right uses of the types of learning; your ability to diagnose difficulties and to do remedial teaching will improve through thoughtful experience; and the influences that good social and physical conditions exert upon learning will become more evident to you. Keep the principles in mind, think about them, study them, and plan your instruction so as to fulfil them. These principles are the fundamentals in planning and teaching. Your worth as a teacher will be judged by your ability to teach them out when you guide the educational growth of America's boys and girls.

APPLICATION EXERCISES

1. This book began with principles of teaching and ended with planing instruction. Which principles of teaching are directly involved in planning? Which additional principles will be involved before the teaching so planned is finally completed?
2. How much of a teacher's success in teaching comes from knowledge of method and subject matter and how much can be attributed to personality? Should improvement of the teacher's personality be included as a hidden part of planning instruction?
3. Which principles of teaching will be taught out more effectively by a teacher who has a strong teaching personality? Illustrate.
4. If you were to teach a unit on safety education for the pedestrian to a group of beginning junior high school pupils, what would be some of your important objectives and learning activities? (Junior high school pupils are included among pedestrians.)
5. What kind of approach would you consider good for safety education for the pedestrian? How would you give the view for the unit? What major developments would you have for the unit, and in what sequence would they come? (As an educational psychologist, do not forget unity in learning.)
6. What similarities are there between a daily lesson plan and a unit assignment? What differences? Is it permissible to make use of daily lesson plans in teaching by the unit plan? Explain.

RELATED READINGS

Bossing, N. L. *Teaching in Secondary Schools,* chap. x. 3d ed. Boston: Houghton Mifflin Co., 1952.

Douglass, H. R., and Mills, H. H. *Teaching in High School,* chap. vii. New York: Ronald Press Co., 1948.

Goetting, M. L. *Teaching in the Secondary School,* chap. xi. New York: Prentice-Hall, Inc., 1942.

RISK, T. M. *Principles and Practices of Teaching in Secondary Schools*, chap. xvi. 2d ed. New York: American Book Co., 1947.

RIVLIN, H. N. *Teaching Adolescents in Secondary Schools*, chap. vi. New York: Appleton-Century-Crofts, Inc., 1948.

RUEDIGER, W. C. *Teaching Procedures*, chaps. xx–xxi. Boston: Houghton Mifflin Co., 1932.

SANDS, L. B. *An Introduction to Teaching in Secondary Schools*, chap. x. New York: Harper & Bros., 1949.

SCHORLING, RALEIGH. *Student Teaching*, chap. vi. 2d ed. New York: McGraw-Hill Book Co., Inc., 1949.

STILES, L. J., and DORSEY, M. F. *Democratic Teaching in Secondary Schools*, chap. xiii. Chicago: J. B. Lippincott Co., 1950.

THUT, I. N., and GERBERICH, J. R. *Foundations of Method for Secondary Schools*, chap. vii. New York: McGraw-Hill Book Co., 1949.

INDEX

Ability grouping: as means to provide for individual differences, 279–85; not wholly sufficient as means to provide for differences, 284
Approach: as illustrated in teaching safety education in the home, 419–21; planning of, 419; punctuation as example of, 183
Assignment: as beginning-point in teaching, 179; content of unit assignment, 276–77; daily, 271; differentiated, 275; good judgment to be exercised in making of, 189; as illustrated in air pressure and its uses, 188; as influence upon study, 240–42; in lesson plan, 415; as means to provide for differences in mixed groups, 270–77; and mind-set, 182; and objectives, 180; planning of, 275; and study, 185–87; in teaching Declaration of Independence, 180–82; in teaching units, 204–8; unit assignment, as means to provide for individual differences, 272–75

Barr, A. S., 152, 335
Baxter, Bernice, 368
Benezet, L. P., 252
Billett, R. O., 268, 297, 394
Book, W. F., 119
Brownell, W. A., 95
Brueckner, L. J., 309
Burton, W. H., 61, 139

Challman, R. C., 76
Class time: marking time during, 237; profitable uses of, 172–77; responsibilities of teacher during, 169–78; unprofitable use of, 171–72

Dewey, John, 114
Diagnosis: anticipation of weaknesses in, 308–10; during class period, 176–77; conferences and, 316; as continuous process, 317; difficulties in learning, general causes of, 301–3; difficulty in learning, meaning of, 300–301; and measurement, 378; and methods of discovering causes of weaknesses, 310–17; of pupils' difficulties in study, 242–45; and remedial measures, as principle of teaching, 18–19, 300–321; of specific difficulties in learning, 303–8
Discipline: causes of poor, 332; correction of misbehavior, suggestions for, 329–30; good social behavior as an objective in, 332; high-school responsibility, in securing good, 333; kinds of corrections used to secure good, 337–38; prevention of disciplinary troubles, suggestions for, 327–28; and punishment, 336; and pupil adjustment, 330–32; teacher and, 334
Drill: conducting of, 346–50; criterion of effective, 347; general treatment of, 345–50; the teacher during, 349–50

Emotional type of learning: development during the stages in, 127–35; development of attributes in, 125–27; general treatment of, 122–35; sequence of stages in, 127; suggestions for direction of, 132–34
Emotions, as source of motivation, 156
Environment, general treatment of, as principle of teaching, 324–39
Examinations; *see* Measurement
Experiences: lack of, as difficulty in learning, 305–6; in solving mathematical problems, 252

Fontaine, E. C., 197, 218

Garinger, E. H., 332
Gates, A. I., 75
Gulick, L. H., 367

Heating, of classroom, 325
Hill, H. C., 241
Homogeneous grouping; *see* Ability grouping

Illustrations of teaching: approach, in teaching punctuation and "Enoch Arden," 183–84; Articles of Confederation, 94–95; in assignment, as analogy between Eisenhower and Washington, 173; "Community Life Problems" in Des Moines, 212–15; continuous day at the North Pole, 69–70; "Critical Period," 204–8; Declaration of Independence, 180–82; division of decimals, 109–10; measurement of lumber, contrast of two procedures, 409–15; nouns, in individual instruction, 293; percentage, 58–60; positions in President's cabinet, 91–92; project, in teaching French, 287; a proverb, 79; "The quality of mercy is not strained," 79–80; safety education in the home, 416–23; science class, pressure in automobile tires, 116–18; volume of pieces of metal, 115–16

Individual differences: distribution of, 265; importance of provisions for, in securing good discipline, 334; project as means to provide for, 285–89; providing for, in mixed groups, 270–79; providing for, as principle of teaching, 265–98; summary of ways to provide for, 296–98; ways of providing for, 267–70; wide range of, 7

Individual instruction: evaluation of, 295; illustration of, in teaching nouns, 293–95; as means to provide for individual differences, 291–95; purpose of, 292; two phases of, 292

Interest, laws of 160–62; *see also* Motivation

Irion, T. W. H., 303

Jersild, A. T., 76

Judd, C. H., 90

Köhler, Wolfgang, 86

Learning: causes of difficulties in, 301–3; during class time, 169–71; diagnosis of specific difficulties in, 303–8; direction of, in low-ability groups, 281–82; importance of, as process, 9; laws of, 160–62; listening, as important in, 361; and objectives, 61; and reviews, 354

Lesson plans; *see* Planning the teaching

Lighting, of classroom, 326

McConnell, T. R., 76

Measurement: common sense to be exercised in giving of marks, 401; and construction of examinations, 381–89; as continuous process, 375; and criteria used in construction of tests, 381–82; diagnostic tests in, 313—16; doubtful purposes of, 376; and failure grades, 402; and grades, 379; main purpose of, 377–79; and marks, as based on curve of normal distribution, 399; and marks and marking systems, 393–401; as means, not ends, 393; and objectives, 382—86, 390–93; observation as form of, 316; and possibilities in all types of tests, 386; purposes of, 376–80; and relationship with teaching, 389; and suggestions for construction of different types of tests, 388–93; and teacher-made tests, illustrations of, 383–88; time devoted to, 376

Memory: background need in, 92—94; guide in direction of, 92; meaning essential in, 92; mnemonic devices and, 91; organization and, 98; recall and memorizing, 97; true-to-use activity in, 98; *see also* Memory type of learning

Memory type of learning: frequent use of, 90; general treatment of, 90—100; sound activities in direction of, 97–100; *see also* Memory

Miller, H. L., 245

Morrison, H. C., 197

Motivation: during class period, 173; mind-set in motor learning, 102; sources of, in teacher and teaching, 152–60; *see also* Release of the energy of pupils

Motor type of learning: general treatment of, 101–6; steps in teaching of, 101–4

Objectives: appreciations as, 49—50, 124; character-building as important aim, 33; conduct attributes as, 124; contrast between, in teaching how to measure lumber, 411—15;

emphasis upon, 8–9; evolution of, 30–32; general discussion of, 29–51; imperative needs of youth as, 34; and learning activities, 61; as listed by Commission on Life Adjustment Educaton for Youth, 35; nature of, 46–51; percepts as, 76–78; personal attributes as important among, 50–51, 118–20; planning for, in a course or subject, 412; selection of, as responsibility of teacher, 172; selection of most worth while, as principle of teaching, 14–15, 29–51; seven, in "Cardinal Principles of Secondary Education," 33; specific, 36–40; steps in selection of, 43–45; in teaching safety education in the home, 417–18; terminology and, 30; ultimate, 32–39; understandings as, 47–48; weaknesses of teachers in selection of, 42

Percepts: development of, during class period, 174–75; forms of, 76–81; functions of, as sensory aids, 88; as influence upon learning, 305–6; meaning of, 73–74; in teaching skills, 102; and understanding, 76; words not substitutes for, 74–81; *see also* Sensory experience type of learning

Planning the teaching: contrast of two plans in teaching how to measure lumber, 409–12; in daily assignment, 421–23; direction of learning activities in, 418–19; fundamentals in, 408–16; learning activities and their importance in, 413–15, 421–23; necessity for, 406–8; objectives as important in, 411–12; plan for teaching safety education in the home, 416–23

Principles of teaching: as fundamental guides, 424–25; general discussion of, 11–22; listed, 22; meaning of, 20

Problem-solving type of learning: broad treatment of, 107–21; children's failure to learn through, 119; deductive reasoning in, 110–11; inductive reasoning in, 108–10; suggestions for training pupils to think through, 119–20; two kinds of reasoning complementary, 111–13; and understandings, 108–10; values in, 121; values in, conditioned by teacher, 119

Project: attitude of learner essential in, 288; conditions essential in learning by, 289–90; definition of, 286; in different subjects, 290; meaning of, 285–86; in teaching French, 287–88; in unit assignment, 207

Pupil participation in teaching, 354–57

Pupils: characteristics of, in high-ability groups, 282; characteristics of, in low-ability groups, 280–82; dropouts, 5; sources of motivation within, 154–58

Questioning: and objectives, 225; procedures during, 232–33; purposes of, 233–34

Questions: causes of poor, 223; criticisms of, 218–19; highest purposes of, 229; improvement of, 224–26; as influences upon study, 241–42; poor, illustrations of, 220–21; purposes of, 226–30; relationship between number and value of, by Stevens, 222–23; and socialization, 230–31; and use in diagnosis, 311; wording of, 231–32

Radio, in classroom instruction, 357–61

Read, J. G., 387

Reasoning; *see* Problem-solving type of learning

Release of the energy of pupils: forces causing, 149; as illustrated in learning to ride a bicycle, 149–52; as principle of teaching, 17–18, 149–62; teacher as important source of, 152–60; *see also* Motivation

Remedial teaching: during class period, 177, 243–45; and diagnosis, as principle of teaching, 317–21; knowledge of learning basic in, 317–19; procedure stabilizers as guides in, 319–20

Review: conducting of, 354; and learning, 354; planning of, 353; preparation for, 353; purposes of, 351; questions and, 352–53; time for, 353

Secondary education: criticism of, in "Story of the Eight-Year Study," 7–8; criticisms of offerings in, 41; enrolment in, 5; philosophy of, 6; problems in, 7

Self-activity: exercises in, 54–55; forms of, 55–56; in problem-solving type of learning, 113; psychologically sound activity illustrated, 58–60; with psychologically sound activity, as principle of teaching, 15, 53–62; relationship between, and teaching, 70–72; relationship between objectives and, 58, 60–61; rewards of, 56–57; and types of learning, 66–137

Sensory experience type of learning: general discussion of, 73–83; participation exercises in, 86–88; teacher as director of, 81–84; *see also* Percepts

Sheldon, J. A., 215

Skills: correct initial performance in, 104; length of practice periods in learning of, 105; steps in teaching of, 102–4; whole and part learning of, 104

Smith, D. V., 309

Social dynamics: group stimulations in, 368–73; illustrations of, 364–65; meaning of, 364; and methods of teaching, 365–66; and motivation, 363; and place in teaching subjects, 370–72; teacher and, 366–68; values in, 365

Socialization: questioning as means to attain, 230; socialized recitation as form of, 369–70

Stevens, Romiett, 221

Stormzand, M. J., 218

Study: assignment as influence upon, 239–41; diagnosis of weaknesses in, 305; learning through, 239; as an objective of secondary education, 259; promotion of, during class time, 175–76; psychological time for, 246; in school, 238; standards of good performance in, 258–59; subsequent demands as influence upon, 247–48; teaching how to, 248–59; teaching how to, as responsibility of all teachers, 252; teaching pupils to plan methods of, 257–58; teaching ways to, in history, 253–56; teaching ways to, in plane geometry, 256–57; values in, 237

Supervised study; *see* Study

Teacher: and attitudes toward seriousness of behavior problems, 330; as best audio-visual aid, 84–86; and discipline, 334–38; and duty in planning instruction, 215; experiences in learning essential for, 321; personality traits of, 335–36; and promotion of reasoning, 115; responsibilities of, during class period, 169—78; and social dynamics, 366–68; as source of motivation, 152–60; and understanding of learning, 320

Teaching: in average-ability groups, 284; and direction of learning activities, 418–19; in high-ability groups, 283; in low-ability groups, 281—82; in mixed groups, 277–78; numerous techniques in, 9; personality and its importance in, 335–36; relationship between study and, 249; and social dynamics, 365–66; as source of motivation, 159; by unit plan, 191—215

Television, in classroom instruction, 357–61

Thorndike, E. L., 160

Traxler, A. E., 253

Tyler, R. W., 42

Types of learning: balance in use of, 135–37; broad treatment of the five types of, 73–137; as illustrated in teaching "The Chambered Nautilus," 67–69; and objectives, 72; use of, as principle of teaching, 67–137; use of, in teaching science, 69–72

Unit assignment; *see* Assignment; Unit of learning

Unit of learning: "Critical Period" as illustration of, 204–8; development of, during class period, 208–15; an experience in learning by, 193; objectives basic in, 196–200; origin of,

192–93; purposes of, 196–200; taxation as illustration of, 193–96; and unit assignment, 204–8; the view in, 200–204

Unitary learning: in assignment, 188–89; broad discussion of, 139–47; as contrasted with fragmentary learning, 139–41, 142–44; and dependence upon proper guidance of learning, 144–46; and direction of, 146–47; illustrations of, 140–41, 142–43, 144–46; meaning of, 139, 141–42, 145, 191; as principle of teaching, 17, 139; promotion of, during class period, 174; *see also* Unit of learning

Ventilation, of classroom, 325–26

Verbalism, explanation of, 303

Visual and other sensory aids; *see* Percepts; Sensory experience type of learning

Wade, J. E., 33

Wesley, E. B., 306

Wickman, E. K., 330

Witherington, H. C., 20

PRINTED IN U·S·A·

(*Continued from front flap*)

Eight basic components are discovered in the teaching process: objectives, self-activity, types of learning, unitary learning, motivation, provision for individual differences, diagnostic and remedial teaching, and the maintenance of the proper physical and social environment for learning. The psychological basis for each principle is carefully established.

With the theoretical foundations thus firmly laid, Professor Butler goes on to discuss methods by which to "teach out" the principles. This discussion is abundantly documented with illustrations, drawn from both modern and more conventional techniques, which reveal a lively awareness of the actual situation in secondary-school teaching. Thus a working blueprint is provided for a science of teaching in which classroom experience is the ordered and logical result of insight into basic first principles.

FRANK A. BUTLER *has been working with student teachers for twenty years at the Pennsylvania State University, where he is Professor of Education. Before coming to Pennsylvania State, he served first as teacher, then as principal, in both elementary and high schools, and finally as superintendent of schools.*

BOOKS IN EDUCATION

CORRECTIVE READING IN CLASSROOM AND CLINIC

(Supplementary Educational Monograph No. 79)

Edited by HELEN M. ROBINSON

The proceedings of the Sixteenth (1953) Annual Conference on Reading are presented in this monograph. Included are a survey of teaching methods used by UNESCO; problems and solutions in corrective reading; papers directed toward specific corrective reading problems; and practical procedures, case studies, and technical discussions.

CITIZEN CO-OPERATION FOR BETTER PUBLIC SCHOOLS

Edited by NELSON B. HENRY

The contributors to this volume view the American public school as a community enterprise. Accordingly, they have undertaken to stimulate co-operative endeavor for the schools on the part of educators and lay citizens. Their book is a significant contribution to the professional literature—and at the same time a useful guidebook for boards of education, P.T.A.'s, civic organizations, and others actively interested in community-improvement programs that may help develop better public schools.

PART I OF THE 53D YEARBOOK OF THE NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

MASS MEDIA AND EDUCATION

Edited by NELSON B. HENRY

A book designed for parents and teachers which discusses the educational role of mass communications with particular emphasis on the social and psychological effects of the various media upon the students themselves. The mass media can provide enriched learning experiences, and this book suggests ways of using the media successfully and, at the same time, developing in children a discriminating taste.

PART II OF THE 53D YEARBOOK OF THE NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

THE UNIVERSITY OF CHICAGO PRESS